TRANSPORTATION LIBRARY

Pit and Quarry

With which is consolidated

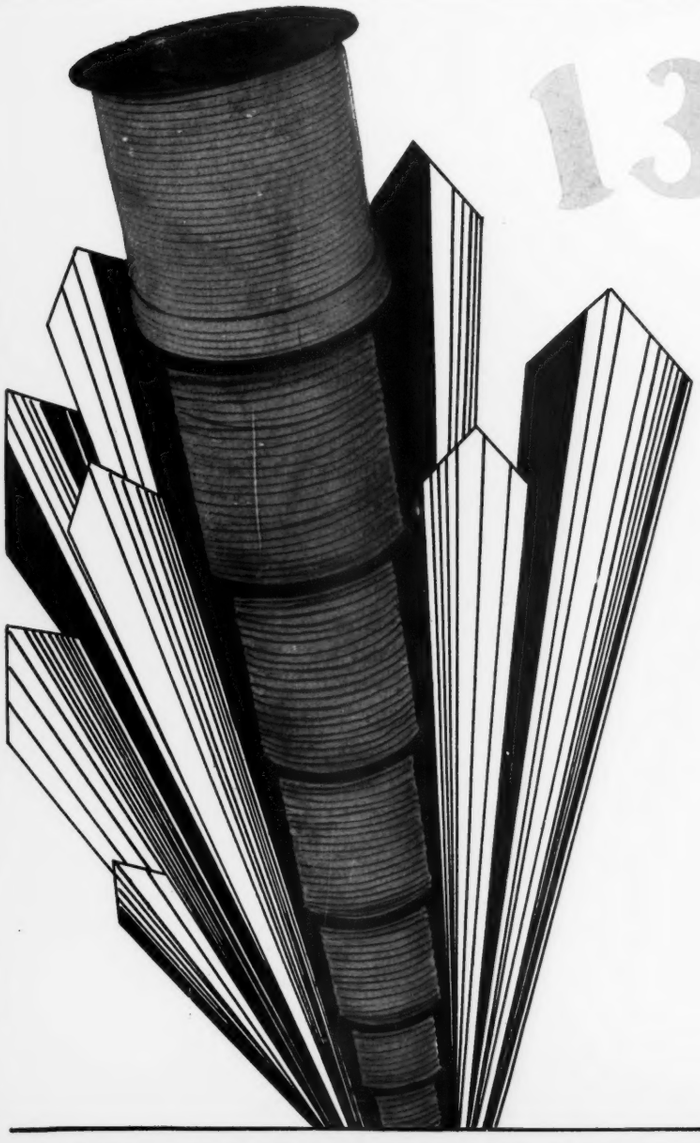
CEMENT-MILL & QUARRY

Member Audit Bureau of Circulations

Read in Largest Number of Plants

The First Paper Devoted to the Production of Non-Metallic Minerals

VOL. XXII | APRIL 8, 1931 | No. 1



13 Miles

This amount of Cordeau-Bickford Safety Detonating Fuse (one of the largest on record), was used to set off the initial blast at the quarry of the new Inland Lime and Stone Co., Manistique, Mich., March 23, 1931. 13 miles, or 68,640 ft. of fuse detonated 160 tons of dynamite over an area of 800,000 sq. ft. 2480 well drill holes 33 ft. deep were used in placing the charge, and an estimated 1,500,000 tons of rock crashed down, with an enormous additional amount of backbreak. Men were kept busy most of the winter drilling the blast holes.

The rock is to be crushed and sized in the company's new crushed stone plant, which is one of the largest and most modern in existence.

Such an enormous blast, perfectly and instantaneously set off, is indeed a tribute to the efficiency, safety and thoroughness of Cordeau-Bickford Safety Detonating Fuse.

Plan to use it on your next blasting job, be it a large or small one. *You will get results that will more than please you.*

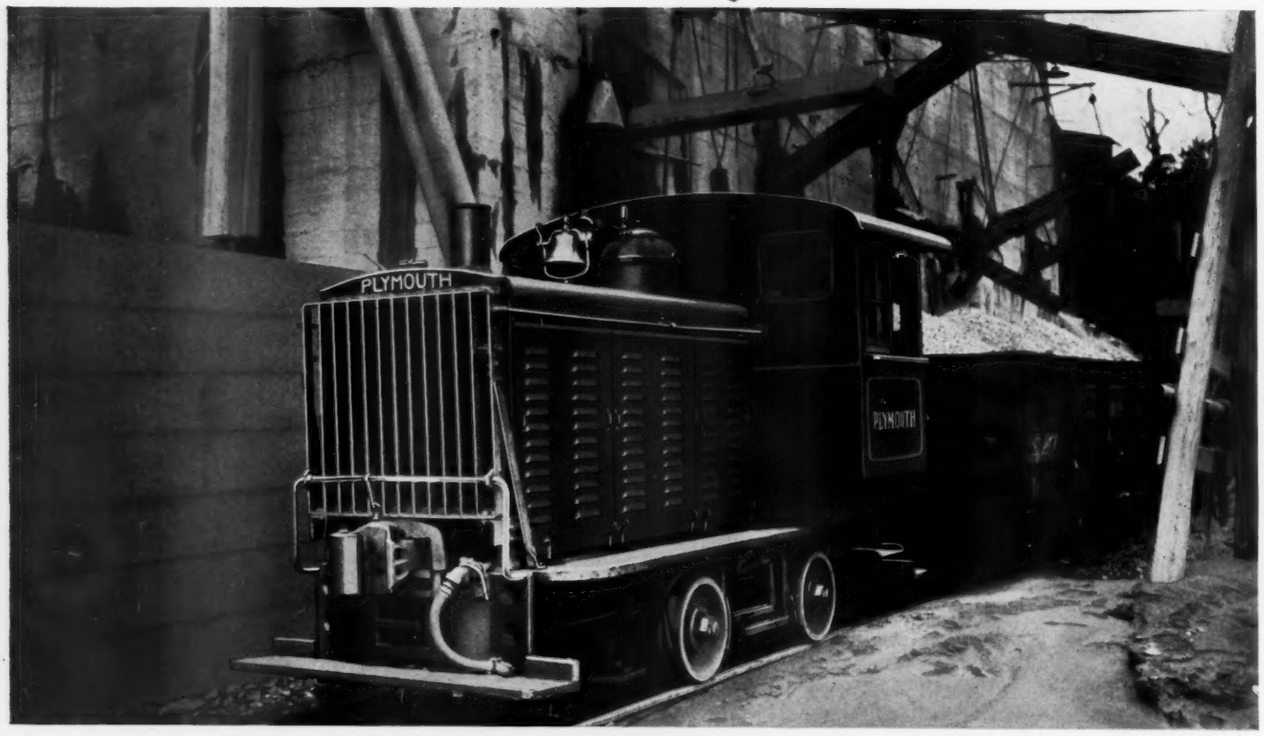
The ENSIGN-BICKFORD CO.
SIMSBURY CONNECTICUT

CORDEAU-BICKFORD

SINCE SEPT. 11, 1929, LARGEST NET PAID CIRCULATION IN THE FIELD
(See A. B. C. Audit Reports for Details)

Engin. Library
TN
1
.861
v.22
no.1

15-TON PLYMOUTH DIESEL
a "life-saver" for W. R. BONSAL Co., Inc.



S. O. Bauersfeld, Sec'y. & Treas. of W. R. Bonsal Company, Inc., Gravel Mining, Hamlet, N. C. in a letter to us, says: "Our superintendent, who knows more about the mechanical feature of our plant than I do, is pleased with the performance of our Plymouth the same as I am. I know that it has been a life saver for us, when prompt and frequent switching service cannot be expected from the railroad these dull times."

PLYMOUTH Locomotives all over the world and in every class of service, are known for the great savings they effect. The 15-ton Diesel Locomotive offers an opportunity for still greater savings through the use of a Buda M. A. N. Diesel engine operating on cheap fuel, and consuming less fuel per horse power than any other type of engine.

PLYMOUTH Diesel Locomotives are ruggedly built to withstand hard usage. With a short wheel base and very flexible spring suspension, they ride rough tracks easily. A high and wide all-steel cab gives the operator good vision over and around cars.

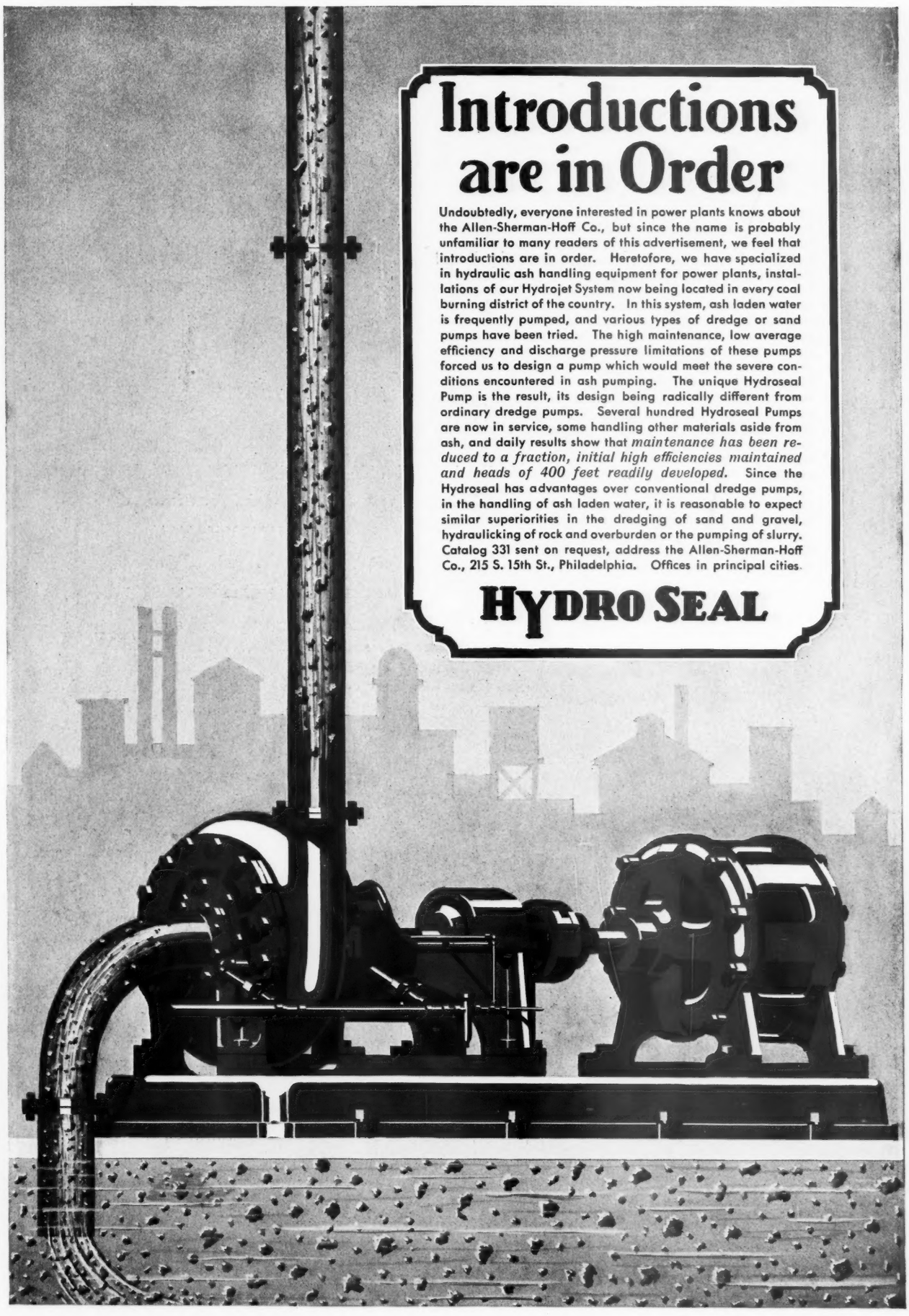
The Plymouth DIESEL Line, from 12 to 100 ton sizes, will interest you. Send for performance bulletin today.

PLYMOUTH LOCOMOTIVE WORKS

The Fate-Root-Heath Company

PLYMOUTH, OHIO

PLYMOUTH
Gasoline and Diesel Locomotives


Introductions are in Order
Undoubtedly, everyone interested in power plants knows about the Allen-Sherman-Hoff Co., but since the name is probably unfamiliar to many readers of this advertisement, we feel that introductions are in order. Heretofore, we have specialized in hydraulic ash handling equipment for power plants, installations of our Hydrojet System now being located in every coal burning district of the country. In this system, ash laden water is frequently pumped, and various types of dredge or sand pumps have been tried. The high maintenance, low average efficiency and discharge pressure limitations of these pumps forced us to design a pump which would meet the severe conditions encountered in ash pumping. The unique Hydroseal Pump is the result, its design being radically different from ordinary dredge pumps. Several hundred Hydroseal Pumps are now in service, some handling other materials aside from ash, and daily results show that maintenance has been reduced to a fraction, initial high efficiencies maintained and heads of 400 feet readily developed. Since the Hydroseal has advantages over conventional dredge pumps, in the handling of ash laden water, it is reasonable to expect similar superiorities in the dredging of sand and gravel, hydraulicking of rock and overburden or the pumping of slurry. Catalog 331 sent on request, address the Allen-Sherman-Hoff Co., 215 S. 15th St., Philadelphia. Offices in principal cities.
HYDRO SEAL

Pit and Quarry

With which is consolidated CEMENT-MILL & QUARRY

Member Audit Bureau of Circulations

Read in Largest Number of Plants

Vol. XXII April 8, 1931 No. 1

Published bi-weekly on Wednesday for producers and manufacturers of Cement, Crushed Stone, Gypsum, Lime, Sand, Gravel and other non-metallic minerals. Entered as second-class matter October 9, 1928, at the Postoffice at Chicago, Ill., under the Act of March 3, 1879.

Copyright, 1931, by
COMPLETE SERVICE PUBLISHING CO.
538 South Clark St.
Chicago, Ill.

H. W. Baumgartner, *President*
V. E. Larsen, *Vice-President*
S. A. Phillips, *Directing Editor*
Arthur J. Hoskin, *Editor*
W. E. Trauffer, *Asst. Editor*
Harry F. Utley, *Asst. Editor*
M. F. Beisber, *Asst. Editor*

Chicago Representatives:
W. A. Buschman L. C. Thaon
Telephone *Harrison 9357*
Chicago, Ill.

New York Representative:
E. M. Buck, 68-43 Clyde St.
Telephone *Boulevard 8-5259*
Forest Hills, L. I., N. Y.

Cleveland Representative:
W. E. Coates, 2198 Elbur Ave.
Telephone *Boulevard 0688W*
Lakewood, Ohio

Subscription price: $5 for 3 years, $2 for 1 year in the United States and possessions, North, Central, and South America; elsewhere $1 additional for each year. Single copies 20 cents.

In This Issue

Editorials 42

Marble Spalls Supply Raw Material for Lime Plant at Knoxville, Tenn. 44

An Improved and Practical Method for Separating Hydrated Lime 47

Improvements Increase Output of Dewey Cement Plant at Davenport, Ia. 49

State Cement Plants Horrible Examples of Government in Business 56

Lime Producer at Saginaw, Ala., Adopts Natural Gas for Firing Kilns 57

Problems of Traffic Management in the Lime and Gypsum Industries 62

New York Lime Plant Adds New Packing, Storage and Conveying Units 65

Should the Big Associations Merge? 70

Victor Plaster, Inc., Modernizes System for Ventilating Gypsum Mine 71

Men of the Industry 75
Coming Events 76
Pumpings from the Old Pit ... 76
Personal Mention 77
Traffic News and Comment ... 78
Financial News 80
Review of Foreign Practice 81
Recent Patents 82
Manufacturers' Publications. 84
Insurance Problems Discussed 85
New Machinery and Supplies .. 86
Legal Information 91

Next Issue April 22, 1931

Pit and Quarry

Member Audit Bureau of Circulations

With which is consolidated CEMENT-MILL & QUARRY

Read in Largest Number of Plants

Vol. XXII CHICAGO, APRIL 8, 1931 No. 1

Inland Opens Quarry with Record Blast

Employs 160 Tons of Powder in Huge Shot

LOOSENS 1,500,000 TONS OF ROCK

One of the largest quarry blasts on record was set off March 23 at the Inland Lime & Stone Co. quarry at Seul Choix, near Manistique, Mich. This blast, which was actually the opening shot of the quarry, required 160 tons of dynamite in 2,480 well-drill holes, each 33 ft. deep. These were spread over an area 4,000 ft. long and 200 ft. wide. An estimated 1,500,000 tons were broken loose by the blast together with a considerable amount of backbreaks. About 13 miles of Cordeau-Bickford safety fuse was used to detonate the explosive. The dynamite used was divided equally between DuPont and Hercules.

The new plant, for which the blast furnished rock, is located at Port Inland, on the shore of Lake Michigan, about 20 miles east of Manistique. The plant, which went into operation in November, 1930, is one of the largest and most modern stone crushing, screening and loading plants in existence. It has a capacity of 750 tons per hr. and can load 3,000 tons per hr. from storage into boats for shipment. The entire operation was completely described in a story published in the Jan. 14, 1931, issue of PIT AND QUARRY.

The quarry is located seven miles north of and inland from the plant. The deposit is almost flat and 60 ft. in depth with a light overburden ranging from 2 ft. to outcrop. The stone is Blaney limestone and is probably in the Lockport formation of the lower Silurian or Niagara series. In color it ranges from gray to buff, is highly crystalline and weighs about 168 lb. per cu. ft. It is a high-calcium limestone suitable for metallurgical purposes, as flux for open-hearth or blast furnaces, for road stone and concrete aggregate.

Several small opening shots were made late in the fall of last year. These furnished sufficient stone to enable the plant to operate for the balance of the season and to store up sufficient material for early spring shipments. Due to the mildness of the winter, the plant did not close down until the middle of January. About 75 men were kept busy two entire months drilling for the large blast. Armstrong 6-in. electric well-drills of the latest type, fitted with crawler treads, were used for this purpose.

Immediately after the blast, preparations were made to get the plant and quarry ready for operation which was scheduled to begin on April 1st.

Oppose Wisconsin Plan for State Cement Plant

Declaring there are insufficient limestone deposits in Wisconsin to permit profitable cement production, H. Vanderwerp of the Manitowoc Portland Cement Co. addressed a committee of the Wisconsin general assembly recently, opposing the bill presented by Assemblyman Ben Rubin calling for the appointment of a committee to study the feasibility of constructing a state cement plant.

It is reported the adverse sentiment will force the defeat of the bill.

Seeks Site for Cement Plant at Redwood City

C. E. Miller, president of the National Silicate Products Co., which operates a plant at Lompoc, Cal., is reported to be seeking a site on the harbor front at Redwood City, Cal., for the erection of a cement plant, to cost approximately $200,000, according to the Redwood City *Tribune*. Other plants in Michigan and New Jersey are also contemplated, it is said.

Rise in River Enables Plant to Resume Work

The plant of the Penglase Sand & Gravel Co., located on the banks of the Wabash River at Grayville, Ill., resumed operation recently following a rise in the level of the river. Drought conditions in that area had so lowered the stage of the water that the plant had been idle since last May.

Erects New Slag Plant at Holliday Cove, Ohio

The Standard Slag Co. of Youngstown, O., has started construction of a new plant at Holliday Cove, O. When completed, the plant will employ from 20 to 25 workmen.

Active Year Seen as Michigan Plant Opens

NEW UNIT TO PRODUCE JULY 1

The Construction Materials Co. was expected to have its plant at Ferrysburg, Mich., in operation by April 1, with all the marine equipment likewise in operation at that time. Officials of the plant report that prospects for a steady run this year are excellent. The new gravel plant, located adjacent to the present one, will not be in operation until July 1. Work is being pushed on the new plant as fast as weather conditions will permit.

The work of fitting out the marine equipment already is under way under the direction of Peter Boet, marine superintendent. The tug *Freedom* recently underwent repairs which included the installation of a new boiler and the *Liberty* is also undergoing repairs. Other tugs are the *J. F. Johnston* and the *Willard L.* The work of getting the steamer *Fontana* in commission already has started. Fritz Britz, first mate, has completed extensive refinishing of the cabins and new plates have been put on the port side of the ship.

The personnel of the Ferrysburg plant as regards department heads, remains the same with Smith Taylor in charge of sales, Layne Rogers being plant superintendent and Peter Boet, marine superintendent.

New Kentucky Operation to Produce This Month

The new plant and quarry of the Greeley Stone Co. located near Russellville, Ky., is scheduled to start production early in April. The new operation will have a capacity of 1,000 tons of crushed stone per day. Power for operation is being supplied by the Kentucky-Tennessee Light & Power Co., which recently completed the erection of lines to the plant.

A new 150-cu. yd.-capacity concrete-mixing plant is being constructed at Clinton, Ia., by the Ready Mixed Concrete Co , Inc., of Ames, Ia.

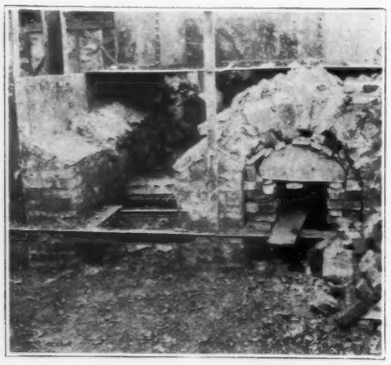
Lime Plants Prepare for Year of Activity

TO BURN COAL INSTEAD OF GAS

With the reconstruction of one of its lime plants and the addition of a crushing unit for the production of crushed stone, the Oliver King Sand & Lime Co., Knoxville, Tenn., is preparing for a busy production season. The company operates two lime-kiln plants at a quarry located on the northerly edge of the city, and a sand plant in South Knoxville on the Tennessee River bank.

At the lime plants, considerable difficulty had been experienced with producer-gas, the combustion material used for four of the kilns. The original 6-kiln plant employs the double-eye type of coal-burning furnaces with a fair-degree of success. With the introduction of producer-gas firing in this locality, the King company installed a complete gas producer and auxiliary equipment in its 4-kiln plant, located adjacent to the original one, with the hope of increasing its capacity.

After considerable manipulation and experiment, no saving in fuel or labor in operation was experienced and it



Construction view of double-eye furnace.

was decided to return to coal firing. Conditions at this plant, because of the kiln construction and their low height, proved unsatisfactory for producer-gas operation, causing difficult combustion control.

All four kilns were rebuilt with double-eye furnaces, two combustion chambers being built on each side. The kiln lining consists of a sandstone rock obtained from nearby mountains and a fireclay mortar also obtained from nearby sources.

For the new crushing plant, a roadway will be cut into the quarry ledge to permit motor-trucks to reach the quarry floor. The crusher and storage bins will be located on ground level near the lime plants. Equipment from the sand plant will be employed in this operation, and timber bins are under construction.

With Mr. King, proprietor of the company, are associated his three sons-in-law, J. H. Agee, C. B. Alexander and G. J. McAfee, all active in the management and sales affairs of the company.

Rebuilt coal-burning lime kilns and double-eye furnaces at Oliver King plant.

Plans Three-Kiln Lime Operation in Louisiana

The Louisiana Lime & Stone Co., recently incorporated for $100,000, is to erect a lime plant at Bastrop, La., with an ultimate capacity of 100 tons of finishing lime per 24-hour day.

Three kilns, with a total initial capacity of 30 tons are to be erected at once.

Will Spend $250,000 on Ready-Mixed Operations

Approximately $250,000 is to be expended by the Pioneer Sand & Gravel Co. of Seattle, Wash., in improvements and extensions to its Tru-Mix ready-mixed concrete plants, according to D. L. Williams, vice-president and general manager.

Operating costs will be reduced and the present capacity of plants is to be increased 50 per cent.

Runaway Box Car Ruins Arkansas Gravel Plant

Damage exceeding $20,000 was caused recently at the plant of the Arkadelphia Sand & Gravel Co. in Arkansas, when a box car on the Missouri Pacific Railway broke loose and crashed into the plant structure. None was injured, as the accident occurred during the noon hour while workmen were off duty.

Universal Gypsum & Lime Expands Chicago Offices

Confidence of large corporations in the return of normal prosperity is reflected in the announcement that the Universal Gypsum & Lime Co. is soon to expand its Chicago offices. The company, now located at 111 W. Washington St., has leased an entire floor of the Loop-Center Bldg. at the southwest corner of Clark and Madison Sts. for five years.

Non-Metallic Minerals Show 15-Per Cent Drop

Estimated total value of mineral products produced in the United States in 1930 was approximately $4,795,000,000, a decrease of 18 per cent from the 1929 value, according to the U. S. Department of Commerce.

The decline in value was accounted for by both lower unit prices and by a falling off in output of nearly all products. Gold showed a slight increase. Notable decreases in mineral products, ranging from 25 per cent to 50 per cent, included copper, iron, silver, lead and zinc.

Estimated value of metallic products was $985,000,000, a decrease of 33 per cent from 1929. Output of non-metallic minerals and mineral products, was valued at $1,028,000,000, a decrease of 15 per cent.

Virginia Greenstone Co. Quarry to be Operated

According to C. G. Loving, the greenstone quarry of the Virginia Greenstone Co. at Lynchburg, Va., is to be re-opened and operated again this season. A number of large orders for the material have been received recently, Mr. Loving has announced.

Denies U. S. Gypsum Is Contemplating Addition

R. G. Bear, treasurer of the United States Gypsum Co., has branded as false the persistent rumor that the company is to construct an extensive addition to its plant at East Chicago, Ind.

Wisconsin Granite Firm Leases Added Deposits

The Red Granite Quarry Co. of Red Granite, Wis., has leased deposits on the farm of Stewart Cornwell, near Plainfield. Work on the development of the stone is already under way.

The Master Marble Co., of San Francisco, Cal., has opened offices at 589 Howard street.

Hold Regional Safety Parley at Washington

DISCUSS CEMENT-MILL THEMES

The regional safety meeting of the Portland Cement Assn., held March 10, at Hotel Raleigh, Washington, D. C., had an attendance of 64. W. M. Powell, safety director at the Cleveland, O., plant of the Medusa Portland Cement Co., presided at the forenoon session. After A. J. R. Curtis, secretary of the committee on accident prevention for the Association, had made a brief report on the progress of the accident-prevention program during 1930, a series of short talks was made upon the common topic, "The One Most Effective New Idea Used by Our Company Last Year to Prevent Accidents," by: W. T. Law, master mechanic, Fordwick plant, Lehigh company; W. G. Skinner, chemist, Union Bridge plant, Lehigh company; H. G. Williams, chief clerk, Norfolk plant, Lone Star, Virginia; S. C. Kohr, chief electrician, York plant, Medusa company; A. R. Couchman, safety director, Hagerstown plant, North American company; and E. Alderton, supt., Martinsburg plant, North American company.

F. A. Walsh, American Optical Co., New York, N. Y., read a paper, "Protection for the Eyes and Head in Industry," which elicited discussion of value.

A paper entitled, "Safe Handling of Explosives in Quarrying," was read by J. Barab, manager service dept., Hercules Powder Co., Wilmington, Del.

E. S. Guth, district manager, the North American Cement Corp., was chairman at the luncheon. The principal speaker was Congressman Menalcus Lankford from Virginia.

The afternoon session was conducted by G. F. Martinez, supt. Norfolk plant, Lone Star Cement Co.

J. H. Zaiser, chief engineer North American Cement Corp., Hagerstown, Ind., read a paper entitled, "Safeguarding Employees During Maintenance and Reconstruction Work" Discussion of this subject was led by W. T. Law, Lehigh Portland Cement Co., Fordwick, Va.

"Investigation of Serious and Fatal Accidents" was the subject of a paper by C. E. Eichelberger, Lehigh Portland Cement Co., the discussion of which was led by E. S. Guth, district manager, North American Cement Corp.

A paper entitled, "The Proper Training of the New Employee," was read by H. A. Leonard, Medusa Portland Cement Co., York, Pa. E. E. Anderson, repair dept., Norfolk plant of the Lone Star Portland Cement Co., led the discussion.

Daniel Harrington of the U. S. Bureau of Mines conducted a first-aid contest between teams representing the Martinsburg plant of the North American Cement Corp. and the Norfolk plant of the Lone Star Cement Company, Va.

Mr. Curtis served as toastmaster during the dinner, at which Mr. Harrington presented the trophy for the first-aid contest to the Martinsburg team, and John A. Dickinson, U. S. Bureau of Standards, spoke upon "Safety Work in the Bureau."

Sturgeon Bay Producer Has Resumed Operations

After being closed during the winter months, the quarry and plant of the Sturgeon Bay Co., near Sturgeon Bay, Wis., has resumed operations with a force of 35 workmen on the payroll. According to Norman Hanson, general manager, the outlook is bright for a busy production season. Officials of the company and guests enjoyed a banquet at the Hotel Nightingale at Sturgeon Bay recently. Guests of honor were W. H. Cameron, production manager, and W. Patnoe, consulting engineer of Cleveland, O.

Limestone Steamer Off on Season's First Trip

The steamer *Diamond Cement*, owned by the Pacific Coast Cement Co., Seattle, Wash., was scheduled to make its first trip of the season on April 1 to Doll Island, where the vessel will take on a load of limestone from the cement company's island quarries for use in the plant at Seattle.

The vessel will operate continuously from now until October, making about 25 round trips with raw material.

Macon, Ga. Stone Plant Installs New Equipment

Clark Memorials, Inc., Forsythe Road, Macon, Ga., of which C. J. Clark is president, is constructing a 40-ft. by 150-ft. building-stone plant, and will move its plant at Americus, Ga., to Macon, installing additional machinery, which has already been purchased.

Crushed-Stone Plant in Ohio Under Construction

J. B. Tressel has started work on a new crushed-stone quarry near Ada, O., and is now arranging for the construction of a plant and the installation of equipment. Stripping operations will commence shortly and it is hoped that production will begin by June 1.

Black Granite Deposit in Minnesota Revealed

A large deposit of black granite has been discovered near Redwood Falls, Minn., it is reported, and the land has been purchased by people living in that city with a view to development. Several granite companies are reported investigating the deposits.

Industries Show Gain in Payroll Reports

CEMENT EMPLOYMENT INDEX UP

Both employment and payroll totals in the stone, clay, glass, cement, brick, tile, terra cotta and pottery industries, increased from January to February, according to the latest figures of the Federal Bureau of Labor Statistics.

The Bureau's figures are compiled from reports submitted monthly by 42,383 establishments throughout the country, representing 15 major industrial groups, having 4,575,000 employees, with weekly payroll totals of $113,623,000.

For these combined groups the Bureau shows an increase in employment of somewhat less than one-tenth of one per cent, but a payroll increase of 4.7 per cent.

Using the monthly average of 1926 as a base of 100, the Bureau shows employment in the stone, clay and glass products industry increased from 57.5 in January to 58.8 in February. This was lower than the average in February, 1930, however, when the figure stood at 72.9.

The payroll totals for the industry increased from 45.9 in January to 50.7 in February. This, likewise, was less than in February, 1930, when the figure stood at 69.

In the cement industry the employment index stood at 56.1 in January, but increased to 56.9 in February. In February, 1930, it stood at 66.1.

The payroll totals increased from 44.4 in January to 50.3 in February, but in February a year ago they stood at 63.7.

In the brick, tile and terra cotta industry the employment index increased from 43.9 in January to 44.5 in February, as compared with 57.7 in February, 1930.

The payroll totals stood at 32 in January, but increased to 43 in February, as compared with 50.6 in February a year ago.

The employment index for the pottery industry increased from 78.5 in January to 79.5 in February, as compared with 92.4 in February a year ago. The payroll index for this industry increased from 60.1 in January to 65.4 in February. In February, 1930, it stood at 86.5.

In the glass industry the employment index increased from 67.3 in January to 70.1 per cent in February, as compared with 89 in February, 1930. The payroll totals increased from 59.3 in January to 67.3 in February, whereas in February a year ago they stood at 89.8.

Rumanian cement producers are reported to have organized a syndicate to exercise control over production through allotment quotas. About 40 per cent of Rumania's producers are represented in the agreement.

Activity in Quarries Aiding Employment

A. L. WORTHEN ISSUES REPORT

Seasonal resumption of activity in the crushed-stone industry is providing a substantial increase of employment at the present time, according to a statement sent to Col. Arthur Woods, chairman of the President's Emergency Committee for Employment, by A. L. Worthen of New Haven, Conn., president of the National Crushed Stone Assn.

"This association represents about 200 firms supplying about 75 per cent of the output of the entire crushed-stone industry," Mr. Worthen said. "Our output and employment normally fall off during the winter in regions where the volume of concrete construction is inhibited by cold weather. The pick-up of production usually comes about the end of March. Already some of our firms are beginning to increase their organizations in anticipation. Although layoffs of personnel have been inevitable, due to seasonality, which is normal, and also to the slump in certain lines of construction, our member firms have made efforts to spread employment as widely as possible by part-time operations and other expedients. Now that resumed activity is close at hand, we shall be able to build up our payrolls substantially.

"How far we can go in approaching the summer employment peaks of former years depends, of course, on the volume of construction which develops. There is no doubt that the expediting of public and semi-public construction will aid our business very materially. The national emergency program already has helped carry us through the depression thus far."

Wyoming Mica Seam to be Worked This Summer

Machinery for mining, crushing and processing mica has been installed at a huge mica seam, near Guernsey, Wyo., by the Western Mineral Products Co. At present a force of workmen is employed in building houses and laying track preparatory to opening the mine.

The Guernsey area has long been recognized as containing some of the richest mica deposits in Wyoming. The highest grade mica is in wide dikes containing immense tonnages of select varieties of feldspar. The latter mineral will be recovered as by-products by the company.

New Discount Method on Agstone in Illinois

COÖPERATE WITH FARM BUREAU

According to Dan Sanborn of the Lehigh Stone Co., Kankakee, Ill., one of the state's largest producers and marketers of agricultural limestone, a new discount plan has been placed in effect for farmers, in coöperation with the Illinois Farm Bureau.

Formerly, a discount of 10 cents per ton was allowed buyers who were farm-bureau members. Much trouble was encountered, however, since, by one means or another, non-members of the bureau also managed to get their stone at a discount.

The new plan provides that buyers throughout the state pay the standard price per ton, certificates worth ten cents per ton being issued with purchases, redeemable only as payment for farm-bureau dues. Thus, a farmer buying a 60-ton carload of agstone is credited with $6 on his dues to the bureau. This new system will, it is believed, not only increase the membership of the farm bureau, but will work out to the satisfaction of all buyers as well.

Production, Uses and Prices of Lime

THE National Lime Assn. prepared the accompanying charts from statistics compiled by the U. S. Bureau of Mines. They cover the period from the beginning of 1907 to the close of 1930.

Fig. 1 shows how production has fluctuated during the period. An interesting notation is that there has been coincidence, among the three kinds of lime, as to peaks and depressions in production.

Fig. 2 covers the uses of lime by three classifications of industry. There is no observable agreement among the three curves, as would be presumed.

Fig. 3 gives the weighted averages or units of lime prices during the same twenty-three-year period.

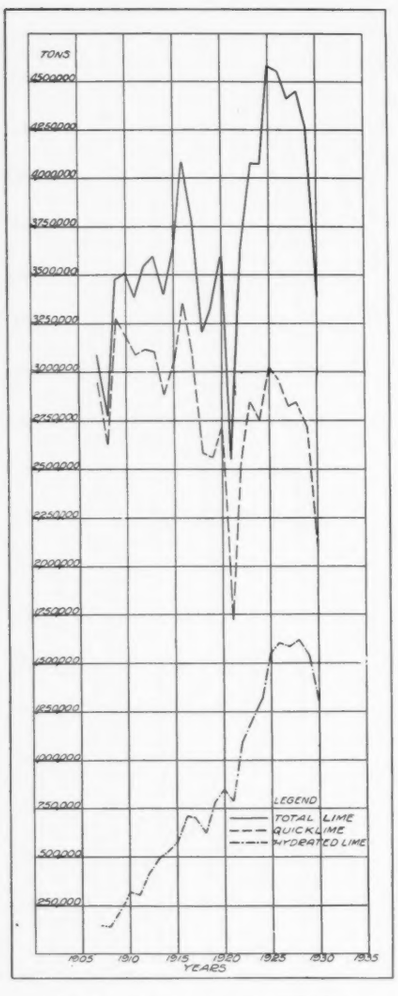


Fig. 1. Lime produced, 1907-1930.

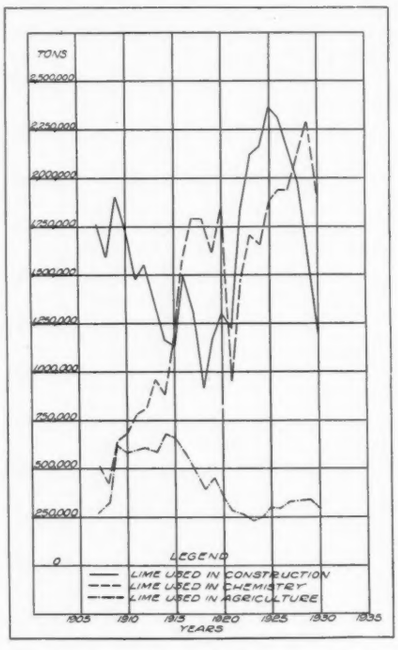


Fig. 2. Consumption of lime by construction, chemical and agricultural industries.

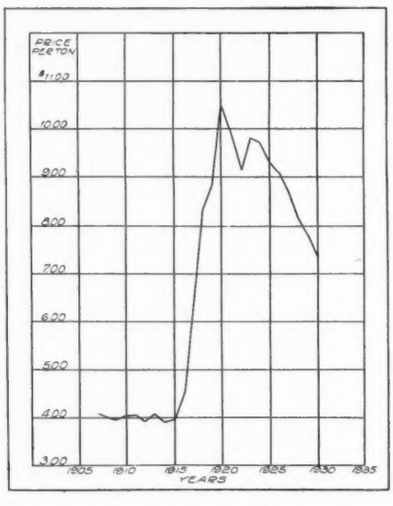


Fig. 3. Weighted averages of lime prices over twenty-three-year period.

Gypsum Price Levels Should be Maintained

FEW MAJOR DEVELOPMENTS

Prices of gypsum products generally, according to the U. S. Bureau of Mines, are expected to remain at their present level during 1931. Present prices are about 15 per cent higher, on the average, than in 1929.

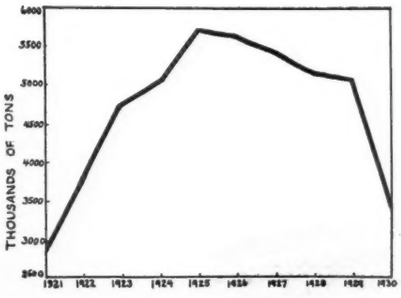
While the price trend during the past four years has been generally downward, the Bureau states, there was a decided upward movement during the past year. Increases were notable in the East and on the Pacific Coast.

The industry is hopeful that 1931 will see the beginning of a new cycle of building, public works accounting for the larger part during the first part of the year, probably followed by a sharp upturn in all construction by the middle of the year. Rises of from 30 per cent to 70 per cent in the price of fibered hardwall plaster, were reported in scattered areas.

Crude gypsum mined during 1930 totaled 3,368,432 short tons, a decline of 33 per cent compared with the 1929 output. The reduction was due to the general falling off in the building construction industry throughout the United States.

There were few major developments in the gypsum industry during the year. With regard to primary producers, no new plants were built or contemplated. The United States Gypsum Co. closed and dismantled its plant at Arden, Nev., and henceforth it will supply the southern and central California market from its plant at Midland, Cal. One western producer of finished gypsum products, the Gypsum Products Corp. (a subsidiary of the Schumacher Wall Board Co., of Los Angeles), completed a new wallboard plant at Seattle, Wash. This company, however, does not calcine its plaster but purchases its requirements from producers.

The gypsum industry in Canada suffered less from the general business slump than did that in the United States, production of crude gypsum decreasing approximately 12 per cent as compared with 1929. A sustaining factor was the export activity of the



Crude gypsum mined per year, 1921-1930.

Gypsum, Lime and Alabastine, Canada, Ltd., whose products are shipped in large quantities to Europe, South America, and Australia. During the year, the Western Gypsum Products, Ltd. completed a two-kettle calcining plant near Winnipeg, Manitoba, and a wall-board plant capable of producing 80,000 feet of board a day. This company secures its crude gypsum from Amaranth, Man., on the southwestern end of Lake Manitoba, where its proved reserves amount to 9,000,000 tons.

The table at the bottom of the page shows the production, imports and sales of crude gypsum and gypsum products for the four quarters of the year 1930. The number of operators reporting for the last two quarters of the year was 31, representing over 99 per cent of the total output of crude gypsum in the United States.

Ohio Sand Producer Is Making Plant Additions

A new mill building has been erected and machinery is being installed at the plant of the Jones Sand Co., Millersburg, O. Production is expected to be resumed some time this month. Spur tracks have been laid to the main line of the Pennsylvania railroad. The improvements are being made under the direction of A. H. Uhl.

Stone Plant in Virginia Is Damaged by Flames

The plant of the George Washington Stone Corp., located on the river front, at the foot of Franklin street, Alexandria, Va., recently suffered a fire loss estimated at about $50,000.

Inquiry Into Cement Industry Under Way

CHIEF EXAMINER ASSIGNED TASK

Getting under way with the investigation of the cement industry ordered by the United States Senate, the Federal Trade Commission has assigned this work to its chief examiner, Herbert L. Anderson. Mr. Anderson is canvassing the mass of data gathered by the Economic Division of the Commission in its inquiry on pricing methods begun in 1927.

This survey of price methods, which has been prosecuted quietly for several years, has developed considerable information as to prices in the cement industry and the theory on which these prices are made, and the effect of these prices and theories on competitive conditions. Involved in this inquiry are such economic questions as showed up in the commission's "Pittsburgh plus" case of several years ago, in which the steel industry was using the single basing-point method of merchandising. Other industries, it has been found, have the identical or similar practices in their merchandising.

In the material developed in this inquiry, Examiner Anderson expects to find considerable information that will be helpful in the cement investigation and thereby avoid considerable duplication of effort.

In laying out the procedure program, contact probably will be made with the Portland Cement Association, and such information as may be available from that source probably will be assembled and analyzed before the field agents of the Commission take up their work in connection with the individual manufacturing concerns and their regional surveys.

Under the Senate Resolution passed in the last session of Congress, the present investigation goes to the matter of prices and practices in the cement industry with a view of disclosing whether or not there is evidence of violation of the anti-trust laws. The Senate action was taken after numerous complaints had been received from state officials and others in which it was charged that prices quoted in several areas were too uniform.

PRODUCTION, IMPORTS AND SALES OF GYPSUM AND GYPSUM PRODUCTS IN THE UNITED STATES IN 1930 BY QUARTERS.

	First Quarter	Second Quarter	Third Quarter	Fourth Quarter
Number of operators reporting	28	28	31	31
Crude gypsum mined (*short tons*)	755,069	1,021,607	929,891	661,865
Crude gypsum imported (as reported by importers) (*short tons*)	(a)	253,960	339,934	204,013
Crude gypsum sold (domestic and imported) (*short tons*)	169,748	286,847	300,468	197,843
Calcined gypsum produced from domestic and imported rock (*short tons*)	615,606	735,428	662,089	553,729
Calcined gypsum products sold from domestic and imported rock:				
For pottery, terra cotta, plate glass, mixing plants (*short tons*)	56,943	52,532	46,345	45,614
Keene's cement (*short tons*)	10,409	10,446	11,102	6,979
Neat, wood fiber, sanded, gauging, finish plasters (*short tons*)	401,624	503,933	475,012	384,993
Wall-board (*square feet*)	117,602,228	145,460,288	96,168,129	87,121,624
Plaster-board (*square feet*)	61,906,689	74,251,280	69,252,296	54,765,352
Partition tile (*square feet*)	9,367,877	10,467,258	7,031,100	6,231,541
Roof tile (*square feet*)	686,142	1,074,242	(a)	896,672
Other tile (*square feet*)	(a)	(a)	(a)	(a)
Other calcined gypsum sold (*short tons*)	3,664	3,415	4,424	4,070

(a)Less than three operators reporting.

Editorials

Checks on Over-Expansion

THE recent past has been a period of severe trial for producers of non-metallic minerals and many of the weak have fallen by the wayside. In the struggle for survival, the less competent—the less favored, perhaps—have broken under the stress of intensified competition and, by so doing, have relieved some of the pressure, to the existence of which they have contributed and as a result of which they have fallen. The ravages of the disease of over-expansion will tend, in time, to bring about the removal of the trouble, much as, in the homely language of the countryside, "the hair of the dog will cure the bite."

No one can reasonably question the statement that the non-metallic mineral industries are badly over-expanded and over-equipped. In the cement industry, wherein, fortunately, the relation of production to capacity is regularly reported, the existence of this condition is, of course, admitted. In the absence of similar data in the other branches of production the case can not be so easily proved, although evidence of the condition is available on every hand.

Business failure is almost always a catastrophe. It disrupts the economic status of the owners of a business, it necessitates radical readjustment in the lives of their employees, it reduces and often destroys the purchasing power of both owners and employees and, so, affects adversely the security of other lines of business. These are commonplaces and apparent to every one.

But economic disaster of this kind, even if it occur on a large scale, may have a wholesome effect on industry. When a considerable number of concerns in a given line of industry disappear from the competitive scene, the conditions surrounding the conduct of that industry may be said to be improved in rough proportion to the extent to which such a reduction takes place. The capital of the extinguished concerns may be lost to their owners, but the capital value of the industry as a whole is not impaired. In fact, the capital value of the survivors is considerably enhanced, since, by the removal of the most destructive competition—that provided by tottering producers—their competitive situation is improved; there are fewer producers among whom the country's business must be divided; and the cost of obtaining business is correspondingly lowered.

Our industries have contributed their share to the number of business failures during recent months, and more are certain to come. There are, however, few cases that have come to our attention that do not, wholly apart from all considerations of individual loss, represent material gains for the industries involved. As long as business is prosperous, competition can be expected to remain fairly clean; but, on the appearance of the threat of reduced business, prices begin to weaken, trade practices that are generally repudiated by business men become more and more common, the bad examples set by those, who in desperation embrace unfair methods, are soon followed, in self-defense, by those whose commercial position seems endangered by them.

The demand for non-metallic minerals is not sufficient to support on a profitable basis all the producers who are engaged in the business of supplying them, and it would be highly desirable, from the standpoint of conserving the best elements of the industry, if some practical and equitable method of restricting expansion and production could be devised. Fortunately the struggle for existence imposes, in business as in biology, important and powerful checks, but, unfortunately, these are slow in making their effects felt, and no business man will ever live long enough to witness the happy results of the process now at work. And, even when these checks are most effective they may prove least corrective, for the remedy required is not only a reduction in the number of producers but a reduction in the number of undesirable producers. The laws of economic survival may extinguish either the desirable producer or the undesirable producer, since they operate largely, if not entirely, on financial standards of elimination and these are not necessarily the standards by which fitness to survive should be judged. But even when they extinguish, by chance, the undesirable producer, the same altruism which befriends the fellow man in need comes to the rescue of the fallen producer, whose depleted or exhausted fortunes are too readily rehabilitated by the unwary investor and the unscrupulous promoter. This is the point where intelligence, having definite aims in view, could accomplish, more effectually and more rapidly, what blind chance, operating by the tedious method of trial and error, would take ages to attain.

In the interest of the solid elements of our industries—and by this we mean those producers who have made lasting contributions to the permanence of those industries—something should be done to hasten the elimination of the unfit and to prevent the breeding of more of the same kind. Most men would probably shrink from the responsibility of declaring which producers should be eliminated; and there is no known method of practicing birth control in business enterprise. And, if these obstacles should be overcome, the proponents of "free and unrestricted competition" would raise a deafening clamor.

But education, conducted through well-planned

and continuous publicity, might accomplish what business so badly needs and what the rules of supply and demand are so slow to provide. It is possible, by pointing out to prospective investors the dangers of entering a field already overcrowded, to exert some restraining influence on the rashness of uninformed capital owners. It is possible, too, by the acquisition and obliteration of industrially dangerous producers, to render more secure the investments of worth-while producers and, thereby, to strengthen the fabric of the industry as a whole. Present conditions have done much to lighten the pressure of destructive competition, but, if history repeats itself, the relief will be but temporary. The return of prosperity will bring with it a rush of hopeful business men, eager to share in the profits of "good times," but unwilling or unable to investigate and properly evaluate the chances of permanent success.

Hastening Buying by Raising Commodity Prices

ALTHOUGH prices are generally thought to be the results of business conditions, they may quite as often be the causes of business conditions. It is generally believed—and there is plenty of evidence to support the belief—that an increase in the supply of a commodity tends to reduce the price of that commodity, and that, conversely, a decrease in the supply tends to increase the price. This connection between supply and demand has so frequently been observed that it has come to be accepted as a law.

On the other hand it has often been demonstrated that the reverse of this relationship may obtain. Without any increase in supply, prices may be reduced and, without any decrease in supply, prices may be raised. The chief difference between the two situations—the one in which price follows supply and demand, and that in which it regulates supply and demand—lies in the fact that the first situation follows what are considered natural causes, while the latter results from artificial control. The possibilities of the latter method, as a corrective of distorted business conditions, have never been properly explored. The present business situation seems to provide ample opportunity for experimenting with it.

It is well known that those business men who, we may assume, qualify as expert buyers, do not buy on a falling market. As long as prices are weakening there is the reasonable expectation that they will continue to weaken, and buying is deferred until buyers are convinced that the bottom has been reached. It is obvious, therefore, that they buy on a rising market, because as long as prices continue to rise it is reasonable to expect that they will rise still further, and the buyer, fearful that he may be forced to pay a higher price if he delays, hastens to take advantage of what he considers a fair price.

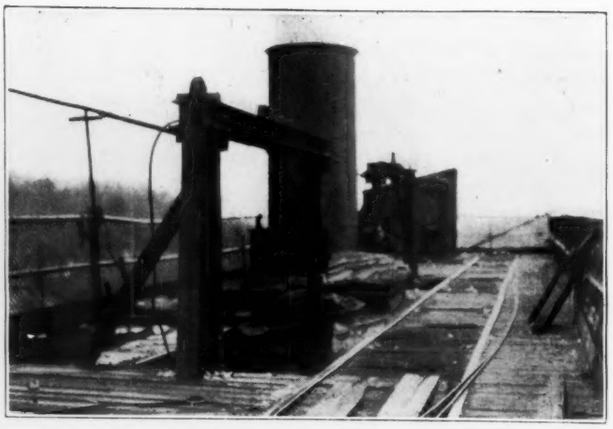
If producers would recognize the importance of this fact—that falling prices retard buying, while rising prices stimulate buying—and then act upon it, they might be astonished at the results. Present prices are too low wherever they fail to reflect the cost of production and sale and a fair return on the capital invested. That this is true and that they have been brought to their present levels by the desire to get some business at any price should be apparent to producers above every one else. And they may rightfully ask themselves whether their policy of selling without profit and, in some cases, below cost is not a worse disease than the trouble they seek to correct and whether, by discouraging buying on a falling market, it does not increase the damage by prolonging the agony.

The idea of profit is inherent in that of price. A price that does not allow a profit is a business anomaly. Even primitive barter was based on the expectation of realizing a profit—certainly for one of the parties to the transaction and, theoretically, for both parties. And the same principle has been carried over into modern commercial transactions. In times of so-called "poor business" it is natural for the sellers of merchandise to seek new outlets for their products and, if superior quality and service no longer attract buyers, the appeal is made through reduced prices. Such a method of relief may have wholesome effects if not carried too far, but when it becomes a policy, followed in every transaction and by every one attempting to make a sale, it becomes pernicious.

That is the situation in business to-day. The talk of service has been worn threadbare; the quality plea has lost most of its appeal through the exposure of dishonest claims and through abuse of the buyer's confidence. As a result, the question of price has assumed unwarranted importance despite the fact that it is but one of many factors in a normal sale. By becoming, in most cases, the deciding factor, it has placed the producer under the dictation of a buyers' market. Even when quality is an issue, it is seldom the main issue, for price has almost always taken its place. For this situation, the seller must be blamed. He has disclosed his weakness, his over-anxiety for business, and the buyer has been quick to take advantage of it. If he now finds the burden unbearable, he must himself apply the remedy.

Prices should be raised. The cost of production, the high cost of competitive selling for which the buyer is largely responsible, and the need for a satisfactory profit justify it on economic grounds. And the expectation that such action will stimulate buying certainly justifies it on the grounds of expediency. Steel prices are already moving upward, partly as the result of increased buying; and orders for steel are increasing, partly as the result of higher prices. The same is true in other fields, but in no case is the advance occurring at a rate that warrants enthusiastic optimism. Perhaps the rate of recovery can be increased by an upward movement of prices. Such a movement is bound to come along with recovery. Why not let it precede and, possibly, expedite recovery?

Kiln-charging floor showing conical charging hopper.



Another charging-floor view showing blower stack.

Marble Spalls Supply Raw Material for Lime Plant at Knoxville, Tenn.

Use of Producer Gas for Firing Kilns Is Developed to High Degree by G. F. Curtin

By MAT F. BEISBER

KNOXVILLE, TENN., is well known as one of the leading marble centers of the country. Surrounding the city are numerous quarries, presenting a picturesque sight with their derrick masts raised to the sky. Huge blocks of this beautiful material find their way to finish mills located in every large city of the country. A large amount is finished at mills owned by the quarrying companies at the quarry locations.

Unfortunately, however, there is a large amount of waste in the quarrying operations. Because of faulty seams, pockets, and off-color blocks, from 30 to 50 per cent of the material is unfit for sale as commercial marble and so is cast aside. Naturally, large accumulations of this waste present a serious problem and, not infrequently, additional land must be purchased to provide sufficient space for its disposal.

Marble is a suitable raw-material for the production of lime. Simultaneously with the development of the marble quarries in this district, lime plants have sprung up to utilize this material. Several plants are located adjacent to quarries and make use of the waste marble for their raw material. Others own and operate quarries, producing marble spalls especially for lime burning.

Marble spalls in scale boxes awaiting use in the kilns. Derrick mast at right.

Marble quarry where the raw material is obtained.

The Curtin Lime Co. plant is representative of the type that utilizes waste marble as its raw material. Not only is it a typical operation but it is representative of the producer-gas method of lime burning.

G. F. Curtin, owner of the company, is largely responsible for the introduction of producer-gas lime burning to this district. Before entering into

the lime business, he designed the installation of one of Knoxville's largest plants and acted as consultant on several other installations in the vicinity. Since his entry into the business, his plant has become exemplary of this method of burning.

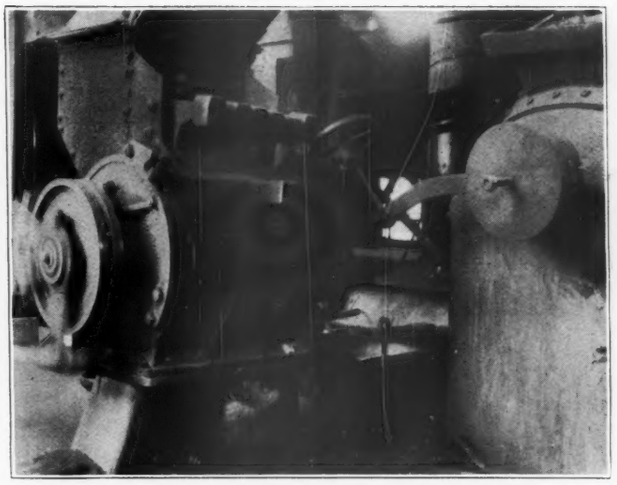
Located adjacent to the Appalachian Marble Co. quarry at Asbury, Tenn., a suburb of Knoxville, the Curtin company has but a short haul for its raw materials. Spalls are made of the waste marble and placed in wood "scale" boxes which have a capacity of 3 to 3½ tons. A derrick raises each scale box from the quarry hole and places it on a car chassis. A train of the cars is then made up and a Plymouth locomotive brings it to the lime plant.

Distant view of the plant, stock-pile of marble spalls, and derrick.

Here another derrick removes each box of spalls and transfers it to a pile of similar boxes, all held in readiness to be sent to the kilns. Sixty scale boxes are kept on hand as a temporary storage of spalls. In addition, a 1,000-ton stock-pile is maintained to supply the kilns when the quarry is not in operation. This stock-pile is sufficient for three weeks' supply.

An American Hoist & Derrick Co. derrick is employed. It has a 60-ft. boom and is operated from a 3-drum steam-driven hoist. The third drum draws the cars up the incline to the charging floor.

Four kilns, each 70 ft. high, make up the battery. They are of the steel-shell type, 11 ft. in outside diameter. Each top is built with a conical charging hopper having an opening of about 18 in. After charging, an inverted bell-shaped pan is lowered into the hopper and seals the top. An induced-draft fan withdraws the smoke and gases from each kiln through a breeching along the kilns near their tops.

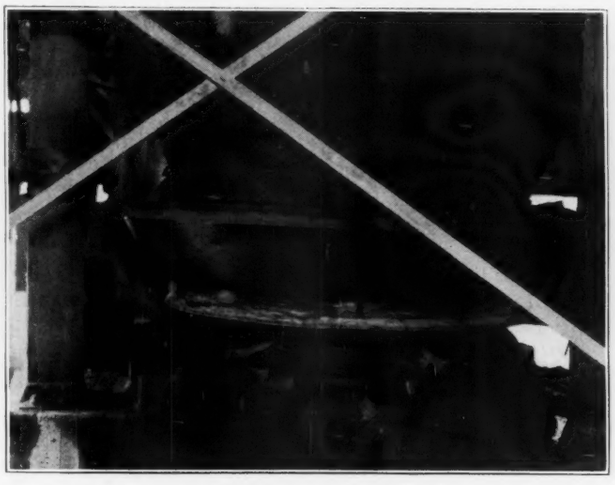


Cylindrical-type coal feeder for the gas producer.

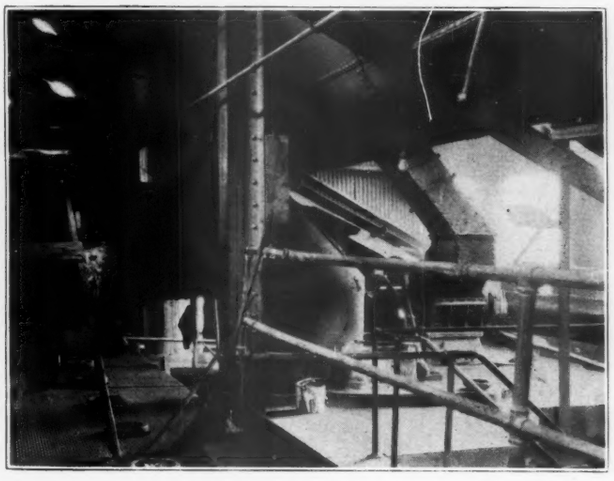
For the hot zone, a special silica-brick lining is used, while above and below this region, a fire-clay brick has been found satisfactory. Both types of refractory materials are furnished to the Curtin company by the Harbison-Walker Co., Pittsburgh, Pa.

The producer-gas equipment comprises the producer itself, an overhead coal hopper, the gas piping, and blast-furnace-type gate-valves at the kilns. About one carload of coal can be stored in the steel parabola-cross-section hopper.

Essentially, the producer, which was built by the Morgan Construction Co., Worcester, Mass., consists of three sections. The top section is stationary and supports the coal feeder and the gas-discharge piping. The middle section, which is pot-shaped, rotates and is separated from the top section by a water seal. The bottom section, while



Bottom view of the gas producer showing rotating furnace pot and trunnions.



Top of producer with coal bunker above, coal feeder, right, and gas-discharge duct.

The plant of the Curtin Lime Co.

rotating with the middle section, permits the ashes to collect on its outer rim to be scooped by a plow held from a fixed point.

The operation of this type producer results in the production of carbon-monoxide gas (CO), incompletely burned carbon. For the purpose of burning lime, a CO gas does not necessarily require a high degree of purity. In fact, 7-per cent CO_2 in the delivered gas is considered relatively insignificant. Consider the producer itself as a furnace without sufficient air for complete combustion of its fuel, with a water jacket to keep the temperature of the generated gas at 1,300 deg., and a good picture of the operation is presented.

In the actual machine, the coal, which is of egg or nut size, is fed into the producer by means of a revolving cylinder-type feeder which delivers approximately 10 lb. of fuel per revolution. The amount of fuel actually delivered is determined automatically by a lever-and-ratchet movement actuated by the same mechanism that rotates the producer-furnace pot. In the interior of the furnace, a rake, held stationary to the rotation of the furnace pot, levels the fuel bed to prevent uneven firing.

Discharge of kiln. Air, drawn through the bottom, cools the lime, and this preheating aids combustion.

Looking into the furnace pot through a ball-check safety valve, a dull red fire is seen—the burning of the fuel to carbon-monoxide gas. As the fuel bed burns, the ashes which are scraped to the rim of the bottom section, are automatically removed by the plow. The producer furnace-pot rotates about once in 15 minutes.

For controlling the volume of air and the pressure of the gas in the pipe-lines to the kilns a steam air-injector is used. With a steam pressure of 50 lb. on the injector, a fixed quantity of air is forced into the producer. This quantity can be varied by hand control of the steam valve. A Bristol recording-temperature gauge on the gas-output line and temperature gauges on the kilns determine the temperatures at these respective places, these being the only information required for ordinary operation.

From the producer, the gas is carried in a large sheet-iron duct to the four kilns. As the producer is placed approximately in the middle of the plant with two kilns on each side of it, the duct length and corresponding pressure drop are kept at a minimum. It is natural, however, that the two center kilns are somewhat favored, principally because

One of the kilns showing gas-duct entries from right and left sides.

the gas at this point does not suffer the radiation losses which occur further along the ducts toward the two outer kilns. Each kiln receives its gas from two points opposite each other; in other words, the ducts are split at each kiln, half the gas entering the kiln from one side and half from the other side. The quantity of gas entering is controlled by a blast-furnace-type duct gate.

To produce a uniform draft in all four kilns, an American Blower Co. No. 7 blower has been installed in an inclosed house near the top between the two center kilns. An 18-in. breeching from the end kilns enters a 24-in. breeching from the center kilns and thence into the blower. The stack above is 48 in. in diam. This type of draft control with the closed-top kilns insures uniformity in burning and consequently a more uniformly burned product.

Some of the advantages claimed for the producer-gas method of burning include a reduction in labor cost, economy in burning, increased capacity to

(*Continued on page 69*)

An Improved and Practical Method for Separating Hydrated Lime

By G. R. WAMSLEY, C. E.

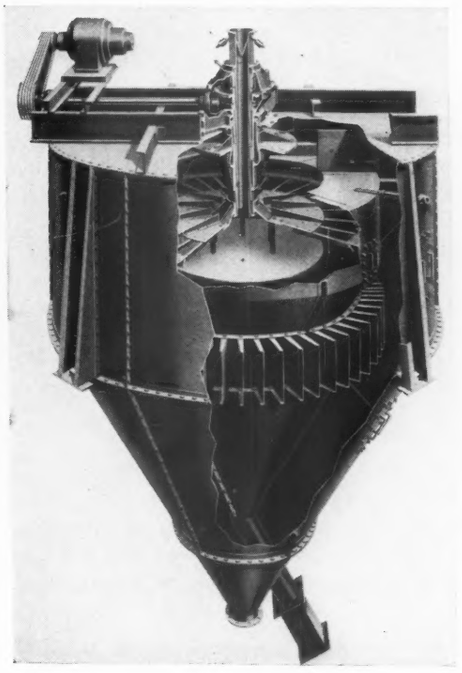
THE increasing number of uses for hydrated lime in diversified industries has brought about continual improvement in methods of production during recent years. The quality of the finished product is largely determined in the final process, wherein the material is refined (by the elimination of impurities) and the hydrated lime classified by air separation into the required grades. Here the adoption of efficient equipment is highly essential to the successful manufacture of chemical hydrates, as well as masons' lime and finishing lime.

Before going into detail regarding the new method proposed in this article, it will be well to review briefly the usual present-day practice, for the sake of comparison. Many variations of plant layout are followed in the manufacture of hydrated lime but, for the most part, they conform to the straight-line method of production. In this case, the burnt lime or caustic is delivered direct to the hydrator. Or, if in too large size, it is passed through a disintegrator or coarse crusher to make it more uniform. From the hydrator, the lime generally goes to an air-separation unit which classifies the material and discharges the finished product to a storage bin or direct to the packers.

Where a continuous-type hydrator connects to the separating apparatus by a screw conveyor, the only control over the flow of the lime is at the head of the hydrator. Virtually the same condition obtains in the case of a batch hydrator discharging to a bin underneath from which the lime goes via a screw conveyor to the pulverizing unit. In either type, the separator system is tied to the operation of the hydrator and must take the flow of lime just as it comes. There can be no close regulation of the feed to the pulverizer and, therefore, any variation in the rate of material flow naturally affects the finishing operation.

When an overload occurs on the separator and the flow is changed at the head of a continuous hydrator, the effect of the adjustment may not show up for perhaps one-half hour. With the batch hydrator, the screw conveyor gives the variation in feed but, since the flow is usually erratic, it may vary as much as 500 to 1,000 lb. per hour. This is all right in making masons' or finishing lime, for the average capacity of a good pulverizer will have an allowable range of from 4 to 6 tons per hour on a medium-size unit. Where the specifications of the product are more exacting, a proportionately closer control over the finishing operation becomes necessary.

With the foregoing operation, a variation of 500 lb. per hour in the mill-feed is not detrimental in the case of ordinary grades. A good average product will result, showing all the material passing a 30-mesh screen, and with from 90 to 95 per cent passing 100-mesh, with very little loss of the good lime in the tailings. For the better quality chemical hydrate, however, the required close control over the finishing operation is secured by modifying the arrangement for straight-line production. This modification consists in divorcing the hydrator from the separator by introducing an intermediate storage bin or feed reservoir which, in turn, supplies the separating equipment. Usually, two pulverizers are employed in plants where both the fine chemical hydrate and the ordinary masons' lime are manufactured.



Mechanical air separator, the key unit in the new method of air separating hydrated lime. Used directly following the hydrator in combination with an automatic pulverizer.

The supply bin should be sufficiently large to hold several hours' supply for both machines. At the bottom of the bin, special hydrated-lime feeders should be used to provide a uniform feed to the pulverizers, by means of gravity spouts leading to the mill hoppers. Each feeder should be synchronized with the corresponding pulverizer speed to prevent either flooding or underfeeding. In this way, a constant load can be maintained on the separating units, an important detail in the finishing operation. Plants with this dual equipment are able to produce not only the finishing lime but also a fine grade of chemical hydrate, such as 99 per cent through 300-mesh, which means a product practically free of impurities and grit.

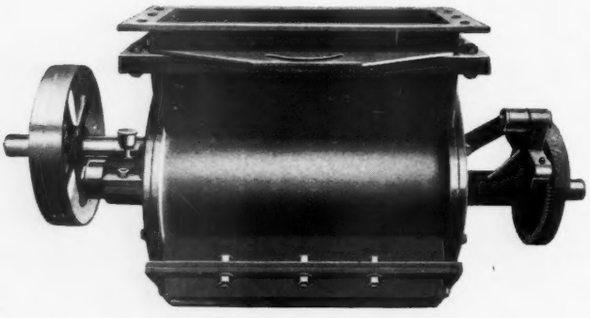
By long specialization in this field, manufactur-

er's engineers have been able to perfect methods of operation and to work out efficient plant designs which contribute greatly to economy of production and to improvement in the quality of the finished product.

The new method of separating hydrated lime, which promises to supersede other methods particularly for making the finest grades, is made possible by the development of the mechanical-air separator to a degree that permits its use directly following the hydrator. This centrifugal separator is the key unit of the new system. The usual flow-sheet consists of a hydrator, an elevator, a mechanical-air separator, an automatic pulverizer with a double-cone vacuum separator, and a set of collectors discharging to storage bins or to the packing machines.

The important work of the mechanical separator is to take the entire flow of the lime from the hydrator, just as it comes through the screw conveyor, and to scalp off a maximum percentage of the fines. It delivers this fine material—pure hydrate—to the finish bin. This is the highest-grade product, free from impurities and of extreme fineness and uniformity. Owing to the fact that the mechanical separator will deliver an absolutely uniform product regardless of any variations in the rate of feed or in the coarseness or fineness of the hydrated lime, there is practically no limit to the flexibility of the system. The operation can be speeded to capacity without affecting the final grades of material obtained.

The oversize particles are separated out and discharged into the hopper of the pulverizer. This machine is equipped with a throw-out attachment which expels the unburnt stone and other foreign material. The good lime, which may contain some

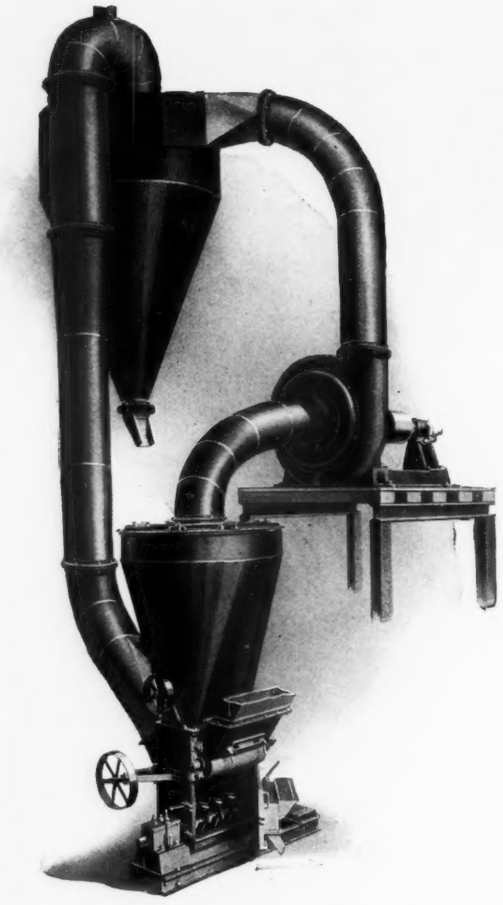


Feeder for introducing hydrated lime at a uniform rate to pulverizing or separating units. Built in two sizes, with capacity range of from ½ to 20 tons per hour.

lumps, is broken down by impact in the pulverizer and is classified in the vacuum-air separator. If the ordinary grade of finishing lime is wanted, the discharge from the pulverizer goes directly to a collector and storage bin. But if a high-grade, chemical hydrate is required, the pulverizer delivers the material back to the mechanical-air separator, where the finest particles are skimmed off as before.

It will be seen that the combination of a mechanical separator and a pulverizer affords a simplified arrangement that takes up a minimum floor space and requires little labor or supervision. The operation is completely automatic from hydrator to storage, and practically no adjustments are needed to control the flow of the material, since the wide range in capacity of the mechanical-air separator takes care of any normal variations which may develop in the feed.

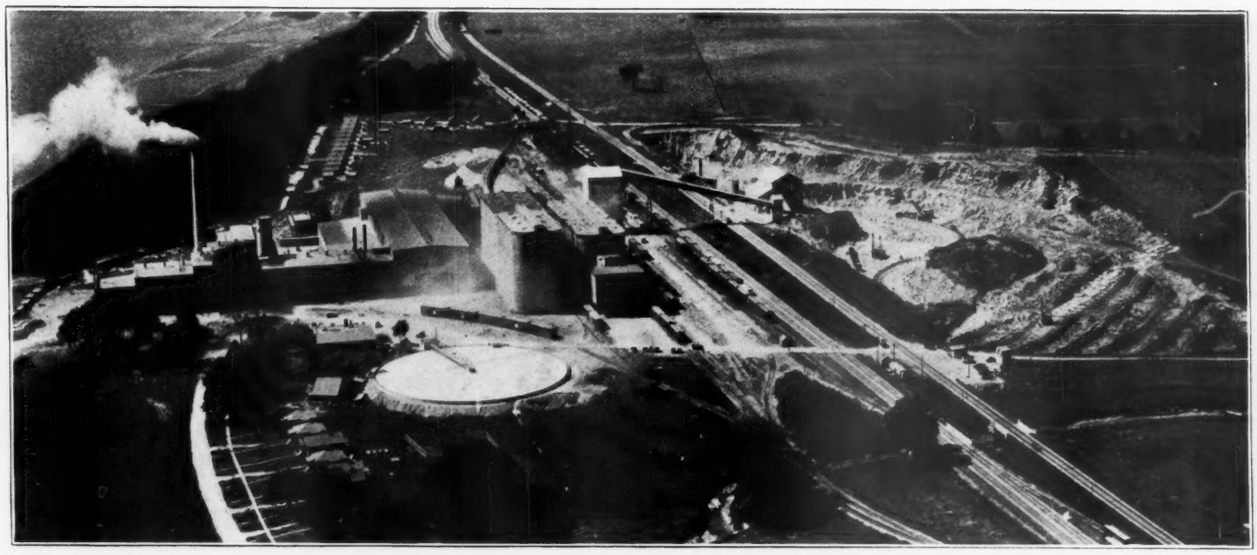
Even the highest specifications can be met with the method. The first skim-off of the mechanical-air separator is the "cream of the lime," equivalent



Automatic pulverizer for hydrated-lime installations. May be used as an independent unit in straight-line production, or as supplementary equipment in combination with a mechanical air separator in the new system of hydrated-lime manufacture.

to a pure product obtained from a refining operation. This part of the process is so efficiently done that tailings carry only a small percentage of fines, and these are largely recovered in the pulverizer operation. Moreover, the rejection of the impurities is positive and automatic with almost no loss of good material.

This type of installation is readily applicable to any plant without extensive alterations. It is a compact arrangement that will occupy less space than the usual chain of equipment. Its economies are substantial enough to justify the investigation of plant owners who are engaged in the manufacture of the best grades of hydrated lime.



An aerial view of the plant of the Dewey Portland Cement Co. near Davenport, Ia. The quarry is at the right and the traction thickener is in the foreground.

Improvements Increase Output of Dewey Cement Plant at Davenport, Ia.

Closed-Circuit Wet Grinding and Slurry Filters Also Lower Power Requirements

CLOSED-CIRCUIT grinding of raw materials in dry-process cement plants has been an approved practice for some time. A number of closed-circuit, finish-grinding installations also have been made with satisfactory results. The closed-circuit wet-grinding of cement raw materials, however, is something which had been confined entirely to laboratory investigation and tests. It remained for the Dewey Portland Cement Co. to become the pioneer in this field by making the first installation on a commercial scale at its Davenport, Ia., plant early in 1930.

This step was sponsored by H. F. Tyler, first vice-president of the company and in charge of operations at this plant. Mr. Tyler has had 23 years of experience in making Portland cement and this is evident from the modern and efficient methods used in this plant and from the success of the new installation. Mr. Tyler was in charge of the company's plant at Dewey, Okla., from the time it was built in 1911 until 1926 when he came to Davenport to supervise the construction of the new plant.

The plant first went into operation in June, 1927, and was completely described in the Oct. 26, 1927, issue of PIT AND QUARRY. Since that time and previous to the installation of the closed-circuit, wet-grinding system a number of changes of major and minor importance were made in the plant and quarry. Among these were: the opening of a new level in the quarry and the purchase of several new locomotives; the opening of a new clay pit; the enlargement of the crushing plant; the installation of equipment for producing sized aggregate; the

Two photographs of the plant forming a general view.

Loading clay in the pit for shipment to the wash mill.

Loading stone to cars hauled by gasoline-electric locomotive.

installation of a clay wash mill; the addition of a third kiln with the attendant cooler, raw- and finish-grinding mills, and waste-heat boiler; the addition of 24 storage silos to the original six; and the installation of slurry filters.

When the plant first went into operation the overburden from the quarry, which consisted of from 4 to 6 ft. of loess, was used as raw material. This, together with the top 40 ft. of stone, made an almost perfect raw mix. When the quarry was deepened, however, to make available a more suitable stone for aggregate and agricultural limestone, a steadier and more abundant supply of clay was found necessary. The overburden is now hauled away to a dump. About 100,000 cu. yd. were dumped along the river front so that a wharf for river transport can be built at any time.

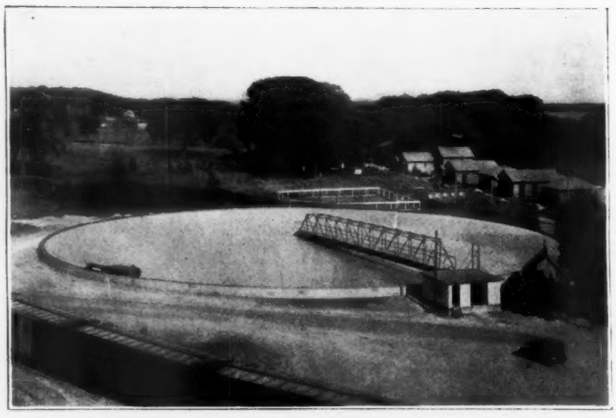
After considerable prospecting, a clay pit was opened in November, 1929, about one-half mile north of the quarry. The clay is a glacial deposit with some loess. Red-granite boulders are sometimes found embedded in it and gravel is present in small quantities. The clay has a low silica ratio which is ideal under present conditions. The pit has a 25-ft. face which is excavated by a P & H 1-cu. yd. convertible gasoline shovel. This loads into Kilbourn & Jacobs 6-cu.-yd.-capacity side-dump cars which are hauled to the quarry by a Davenport 15-ton saddle-tank steam locomotive.

At the quarry the clay is dumped to a concrete hopper in the top of the washer building which is built alongside an abandoned face of the quarry.

The 650,000-bbl.-capacity cement-storage silos.

This unit went into operation when the clay pit was opened. The clay is taken from the hopper by a Webster 36-in. apron conveyor which feeds to the Allis-Chalmers 26-ft. American wash mill. This removes the gravel and silt to a spoil-box alongside the building which is cleaned out periodically. The clay slip, which has a moisture content of about 60 per cent, is handled by a Wilfley 4-in. pump to the original clay-storage tanks. The slip is pumped a distance of 1,600 ft. against a head of 75 ft.

The quarry is worked in two 40-ft. levels, the upper for cement rock and the lower for aggregate and agstone, each having a separate incline to the crushing plant. The upper level is known as Cedar Valley limestone and the second as Upper Davenport limestone. Below these is a 40-ft. deposit of Lower Davenport limestone. Drilling is done with Keystone well drills. Trojan powder and Cordeau-Bickford safety fuse are used in the blasts which sometimes use as much as 10 tons of explosive at one time.

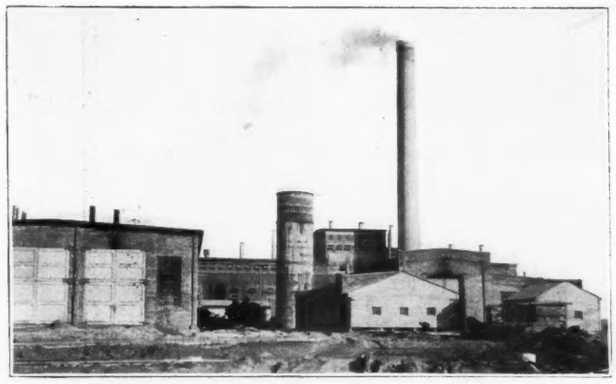


The 225-ft. traction thickener. Note the steel truss bridge in the center and the drive end of the scraper mechanism at the left.

The Bucyrus 3-cu. yd. 100 B electric shovel formerly used for cement rock is working the lower face. A new Bucyrus 2-cu. yd. 50 B electric shovel was purchased when the second level was opened and this is used on the upper level. Both load to Easton 6-cu. yd. Phoenix-type steel cars. One 15-ton and one 30-ton Davenport gasoline-electric locomotives haul the cars on the upper level to the crushing plant incline. A 15-ton locomotive of the

same make and type on the lower level hauls the aggregate rock to an incline on the opposite side of the crusher building.

Each incline has a double-drum friction hoist which hauls the cars to the crusher building. A tipple dumps the cars into the Allis-Chalmers Superior McCully 42-in. gyratory primary crusher which discharges into a concrete surge box. This discharges through two gates to two Webster Mfg. Co. 48-in. pan conveyors. One of these feeds directly into a Gruendler 52-in. hammermill. The other feeds over an Allis-Chalmers 3-ft. by 4-ft. live-roll grizzly to an Allis-Chalmers Newhouse 10-in. gyratory crusher. This latter unit was installed for the manufacture of commercial aggregates when the second quarry level was opened.



Another view of plant with locomotive house at left. Section added to kiln building for classifiers at left of stack.

Both secondary crushers discharge to a 30-in. inclined belt conveyor parallel to the highway running by the crusher building. A magnet suspended over the conveyor removes all tramp iron. This conveyor discharges to a second 30-in. inclined belt conveyor at right angles to the first. This carries the stone across the highway to the screening building. No changes have been made here since the plant first went into operation except that three Link-Belt 4-ft. by 8-ft. vibrating screens have been added to produce sized aggregate. All stone goes to nine reinforced-concrete bins forming the substructure of the building. As the building was originally designed for the future production of aggregate, the bins are arranged to discharge into

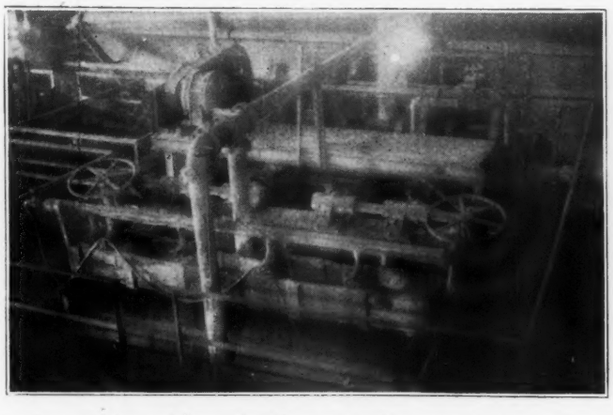
Belt conveyor feeding filter cake to one of the kilns.

cars on three loading tracks below. A 30-in. inclined belt conveyor carries cement rock from this building to the material-storage building and the mill-feed bins which were completely described in the previous article.

The scheme of wet closed-circuit raw grinding may be described as a method in which the mill is operated in closed-circuit with a classifier, which overflows to subsequent operations only that portion of the mill discharge which has been reduced to the required size.

In open-circuit grinding, the feed input to the mill must be cut down to the point where the slurry discharge, from this single pass through the mill, has reached the desired average fineness. Even under these conditions there will be, in the mill discharge, stray oversize particles due to the normal flow of the slurry through the mill and the cascading of the ball charge.

In closed-circuit grinding, the control of the particle size is centered in the classifier and not in the mill. The classifier therefore functions to scalp off the finished material as soon as it is formed, and the oversize is partially dewatered and returned to the mill. What actually happens is that the feed rate of the original material is stepped up and, with this increased volume going through the mill, a greater amount of oversize is produced, to be subsequently returned by the classifier after removal of the finished material. This quantity of oversize



One of the primary classifiers over the raw-grinding mills.

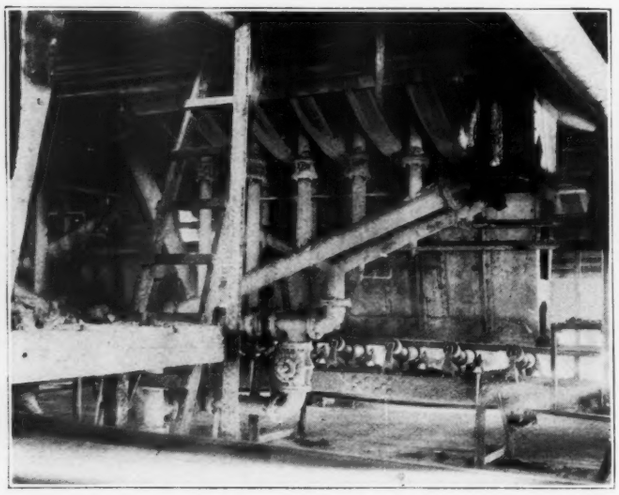
One of the 25-ft.-bowl secondary classifiers.

The three 11-ft. by 175-ft. rotary kilns.

is termed the circulating load and may be as much as 300 per cent or more of the original feed.

Normally the feed rate, and consequently the circulating load, would be increased up to the point where the mill showed that it was grinding as much as it could under the existing conditions of feed size, ball charge, and fineness of grinding, and the mill operation would then become stabilized under these conditions.

There appear to be several factors which permit this increased capacity operation. Due to the increased rate of flow through the mill, uneconomical overgrinding is prevented and the return to the mill of classified oversize particles permits the balls to work unhampered from the cushioning effect produced by a large quantity of fines. In other words the large volume of circulating load, from which the finished material has been removed, permits a much greater quantity of coarse to be exposed to the action of the balls at one time. This contributes towards a lower steel consumption in ball and liner wear since the balls are largely working on rock.



The filter discharging to one of the kiln-feeding conveyors.

The slurry moisture in the mill can also be more properly adjusted to give the best grinding conditions for the size of balls and the size of material which is going through.

Inasmuch as it takes a definite amount of power to rotate the mill with its ball charge, this increase in capacity also results in a lowered power cost per barrel.

The original raw-grinding installation at the Dewey plant consisted of two Allis-Chalmers 7-ft. by 26-ft. two-compartment Compeb mills. When the third kiln was installed a third raw mill was added. Since the closed-circuit system has been installed, however, two of these mills have been able easily to handle this part of the operation, so the third mill is now used for finish grinding of clinker. Each of the two raw mills has 2¼-in. to 4-in. balls in its first compartment and ¾-in. to ⅞-in. balls in its second compartment. A few changes made in these mills to increase their capacity were: the enlargement of the slots in the primary grids, the removal of the peripheral screens, and the installation of larger pipe feeders. A number of changes were also necessary to install the classifying machinery. The most important of these was the raising of the roof of the motor building 12 ft. to make room for the bowl classifiers.

The stone is fed from the bins to the two raw-grinding mills in the conventional manner. The discharge from the first compartments of these mills goes by gravity to a sump from which two Wilfley 4-in. pumps feed to the two 12-ft. wide Dorr classifiers which are mounted above the mills on steel framework. Water is added to the pulp in sufficient quantities for the most efficient operation of the classifiers in making the primary coarse separation. The oversize is returned to the primary compartments of the mills for further grinding, forming a closed circuit. The classifier overflow

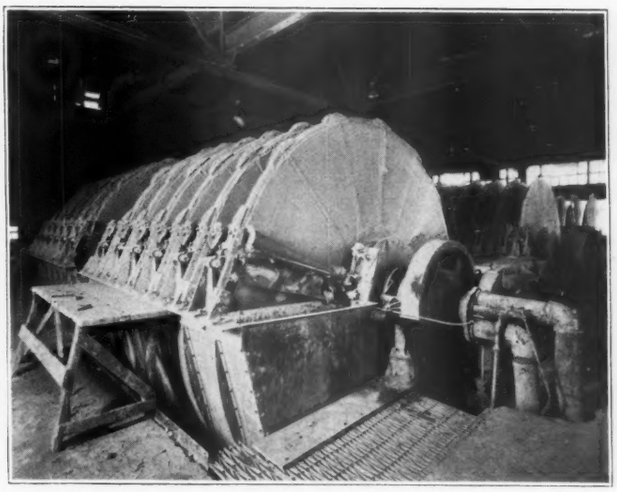
or fines and the discharge from the secondary compartments of the mills, flow by gravity to a second concrete sump.

Two Wilfley 6-in. pumps feed from this sump to the two Dorr 25-ft. bowl classifiers. Here water is again added in order to get the proper slurry dilution for the final classification step, producing in this way an overflow at 97 per cent to 98 per cent through 200 mesh. The coarse material rejected by these classifiers is returned by a screw conveyor and gravity to the secondary compartments of the mills. The clay slip from the wash mill is introduced at this point. The overflow or slime from the bowl classifiers goes by gravity through a 16-in. underground pipe-line to the Dorr traction thickener outside the building about 300 ft. from the mill room.

This thickener is of a type commonly used in the ore industries but is the first of its kind ever used in a cement plant. It is 225 ft. in diam., 7 ft. deep at the circumference, and 22 ft. deep at the center. It is built of reinforced concrete and is almost entirely below the surface of the ground. The slime line is carried on a steel-truss bridge to the center of the thickener where it discharges. The solids which slowly settle from the slurry are conducted by a truss arrangement, fitted with raking blades similar to those on the bowl classifiers, to a central point of discharge. This truss is supported at one end at the center of the thickener and at the other by a traction wheel running on a rail around the top of the tank. It makes one and one-half revolutions per hour. The truss supports three shorter arms, each at right angles to its neighbor and also fitted with raking blades. These supplement the main truss near the discharge openings where the slurry bulks the heaviest.

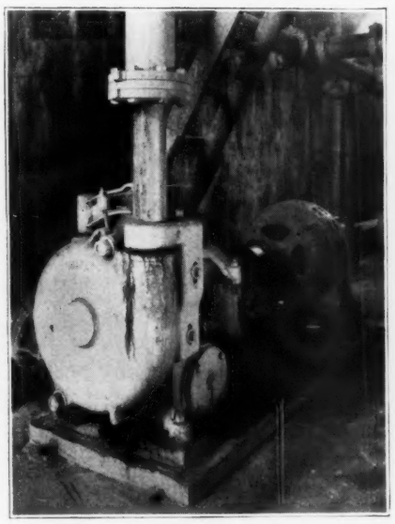
The slurry discharges through three 6-in. underflow lines in a concrete tunnel to a concrete sump alongside the thickener. The excess water overflows the edge of the thickener and is flumed to the river.

The thickener, in addition to performing its chief function of lowering the slurry moisture content, has other uses. As it contains about a three-days' supply of slurry it acts as a surge tank between the raw mills and kilns. This fact gives the chemist ample time to anticipate conditions as the slurry entering the thickener will not go to the kilns for two or three days. The thickener also serves to iron out any variations in the composition of the feed to it and produces a slurry of very uniform analysis.



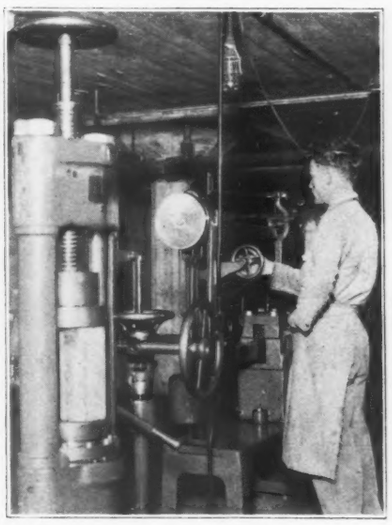
The six 6-disk filters which dewater the slurry for the kilns.

The sludge from the thickener has a moisture content of from 40 to 45 per cent. It is pumped from the sump by two Wilfley 4-in. pumps to seven concrete slurry-mixing tanks where the proper lime content is maintained. These tanks are each 20 ft. in diam. by 40 ft. high and are equipped with Manitowoc Minogue mechanical and air agitators. Two Wilfley 4-in. pumps feed the slurry to the filter installation which is located above the feed ends of the kilns. This consists of six Oliver United Filters Inc. American filter units each consisting of 6 disks 12 ft. 6 in. in diam. Each of the three kilns has two units which give a total of 2,400 sq. ft. of filter



One of the slurry pumps handling primary classifier sands.

H. F. Tyler, first vice-president of the Dewey Portland Cement Co.



The 200,000-lb.-capacity hydraulic compression tester.

area to each kiln. Each unit is driven by a 5-hp. motor through a Foote Bros. triple-reduction speed reducer of special design which has a ratio of 792 to 1. This arrangement gives a speed range of from 5 to 20 min. per revolution. Three Chicago Pneumatic Tool Co. 10-in. by 23-in. vacuum pumps, one of which is used as a spare, maintain the vacuum in the filters. Each pair of filter units discharges to a horizontal belt conveyor which carries the filter cake to a kiln feed screw.

From this point on, operations are substantially as they were when the plant first went into operation except that a third kiln similar to the original two was added early in 1928 shortly after the plant went into operation. Each kiln is 11 ft. in diam. by 175 ft. long and all were furnished by the Allis-Chalmers Mfg. Co. The two original Allis-Chalmers rotary coolers are 8 ft. in diam. by 70 ft. long. The additional cooler is of the same make and length but is 9 ft. in diam. Two additional Allis-Chalmers 7-ft. by 26-ft. Compeb mills were added at the same time, making a total of six in the plant.

Because of the increased capacity of the raw mills due to the closed-circuit system only two are now used for raw grinding. As previously stated, the third was altered and is being used as a fourth finish-grinding mill. These have ample capacity to handle the increased output of the kilns. Plans are under way to install a closed-circuit system on these mills using Sturtevant 16-ft. air separators and vibrating screens. This installation will be put into operation some time during the summer.

The original cement-storage unit consisted of six 32-ft. by 80-ft. concrete silos which, with their interstices, have a capacity of 120,000 bbl. Two additional storage units have been erected since that time. One of these units consists of eight 32-ft. by 80-ft. silos built end-to-end of the original silos. The third unit consists of sixteen 32-ft. by 100-ft. silos located alongside the other two units. Together they have a total capacity of 650,000 bbl. The new silos were erected by Jones-Hettlesater, Kansas City, Mo. The cement-packing capacity was also increased by the addition of a second unit of two Bates 3-tube packers. The loading tracks are so arranged that six cars can be loaded with sacked cement and four with bulk cement at one time. With this arrangement 68 cars have been loaded in one day.

Both the closed-circuit, raw-grinding system and the filter installation have shown gratifying results. This is evident in increased capacity, lower power consumption and cost of operation, and in the higher and more consistent quality of cement produced. The entire installation was made without other delay than that caused by adjusting the various units to the new conditions. The kilns were never shut down at any time.

Left to right: E. B. Smith, chief engineer; Lewis R. Sims, asst. engineer; G. S. Parker, superintendent; H. F. Tyler, vice-president; E. S. Ernst, chief chemist.

Tipple dumping rock from quarry car to crusher.

The 48-in. apron conveyor feeding the hammermill.

Three of the air compressors in the motor room.

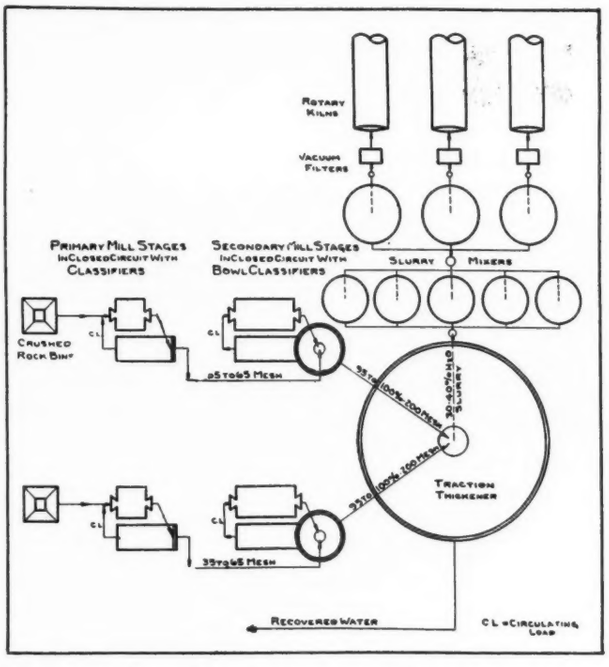
The 26-ft. clay wash mill.

The filters were installed and in full operation in March, 1930. Previous to this installation, the kilns had an average total output of 4,700 bbl. per day. In the 3½ months before the closed-circuit, raw-grinding unit was put into operation this average had been raised to 5,500 bbl. per day together with a considerable decrease in burning costs. Within 3½ months after the closed-circuit system was put into operation the kiln capacity was increased to 6,300 bbl. per day.

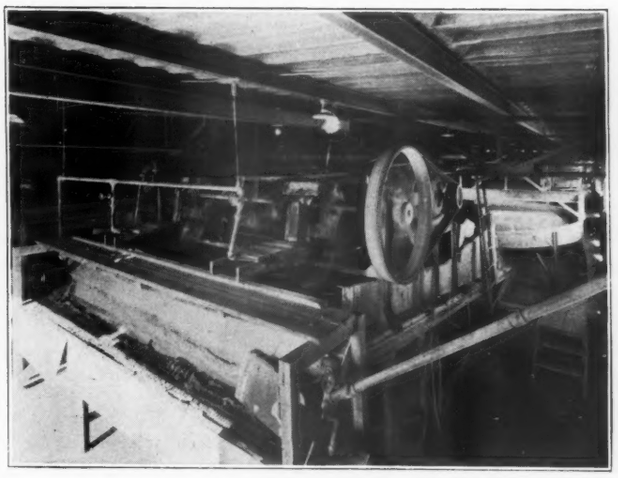
The effect on raw grinding was similarly gratifying. Previous to the closed-circuit installation, the average output per Compeb mill hour was 70.1 bbl. Since this system went into operation, the average output has been increased to 167 bbl. per hour with a maximum of 200 bbl. per hour, an average increase of 138.2 per cent. The power consumption for raw grinding has been decreased from 5.5 kw.-hr. per bbl. to 2.85 kw.-hr. per bbl., a saving of 48.2 per cent. Of the latter total, 0.59 kw.-hr. were used to drive the additional equipment made necessary by the closed-circuit system. This includes the classifiers, the thickener and the circulating pumps.

A considerable saving has also been made in the consumption of grinding media. Before the adoption of the closed-circuit system the loss of grinding media was 0.086 lb. per bbl. in the primary compartments of the raw mills and 0.321 lb. per bbl. in the secondary compartments. Figures now are 0.057 and 0.112 lb. per bbl., respectively. This is an average saving of 33.7 per cent in the primary compartment and 65.1 per cent in the secondary compartment.

The moisture content of the slime fed to the thickener averages about 90 per cent. The sludge leaving the thickener has a content of about 45 per cent. The filter cake fed to the kilns averages between 19 and 20 per cent moisture. These results are responsible, to a great extent, for the increased kiln capacity. Another result has been a more uniform and complete burning of the clinker.



Flow sheet of closed-circuit grinding installation. Compeb mills shown as separate primaries and secondaries to simplify flow lines.



One of the secondary bowl classifiers discharging sands to screw conveyor.

Previous to the installation of the closed-circuit system the raw material was ground to an average fineness of 89 per cent minus 200 mesh and 5 per cent plus 100 mesh. The fineness has now been increased to 97.5 per cent minus 200 mesh and nothing plus 100 mesh. At times, when the mills have been handling only 150 bbl. per hr. each, the fineness has been held to 99.9 per cent minus 200 mesh and 95 per cent minus 325 mesh.

The table below shows the distribution of sizes as determined by screen analyses, elutriation tests and microscopic examinations of particle sizes.

SIEVE TESTS

Mesh	Open Circuit Per Cent	Open Circuit Per Cent Cum.	Closed Circuit Per Cent	Closed Circuit Per Cent Cum.
20	1.0	1.0	...	...
28	0.25	1.25	...	...
35	0.50	1.75	...	...
48	0.50	2.25	...	...
65	0.75	3.00	...	...
100	2.00	5.00	...	...
200	6.00	11.00	2.6	2.6
325	(not recorded)		8.4	11.0

ELUTRIATION TESTS ON UNDERSIZE FINEST SIEVE

	Av. Mesh*				
Jar 1	340	10.7	21.7	16.6	27.6
Jar 2	540	7.8	29.5	5.9	33.5
Jar 3	820	3.4	32.9	6.7	40.2
Jar 4	1,400	8.4	41.3	8.0	48.3
Overflow		58.7	....	51.8	....

*Average size of particle determined by microscopic examination.

A study of these particle-size determinations indicates:

(a) An elimination of stray oversize, coarser than critical size.

(b) A substantial reduction in plus 200 mesh material.

(c) Adequate proportions of super-fines.

Since the adoption of closed-circuit grinding the calcium-carbonate content of the slurry has been held at satisfactory levels. The free lime in the

(*Continued on page 61*)

State Cement Plants Horrible Examples of Government in Business

By HON. WILLIAM R. COYLE
Congressman from Pennsylvania

The accompanying address was delivered Feb. 18, 1931, before the U. S. House of Representatives. It is published herewith because of the unquestioned authenticity of its statements which bear upon a subject that has caused much concern and economic unrest in one of this country's prominent industries. The legislators of states in which the operation of state-owned cement plants is contemplated would do well to ponder the advice offered in Congressman Coyle's conclusion.—EDITOR.

I DESIRE to call the attention of Congress and the country to the results of two experiments in state ownership and operation of cement plants, which are now matters of public record and from which, I feel sure, the advocates of more government in business can take little comfort. In presenting these conclusions I speak as one of the Representatives of the largest cement-producing districts in the country, the Lehigh Valley of Pennsylvania.

My interest in this question was aroused because, almost every winter when state legislative bodies convene, political agitation appears in some section of the country or other for a publicly-owned cement plant. Often my colleagues in Congress coming from states where such agitation has become pronounced have asked me for information as to the history and economic value of publicly-owned cement plants and, until recently, I have been able to give them only a general answer. However, for some time past, I have been collecting data on this subject and, after a serious study of this material with the assistance of several trained and responsible accountants, I submit the results of that study which I believe to be a complete, impartial, and accurate one.

There are at present two state-owned cement plants in operation in the United States—one at Chelsea, Mich., another at Rapid City, S. D. The Michigan plant is manned by convict labor. It was leased by the state in 1923. The lease provided for purchase by the state in five years or less and, under this provision, Michigan became owner of the plant in 1925 at a cost of $500,000 plus inventory of stock and certain minor additions.

Since state operation started, the plant has been a center of controversy and dissension—political and otherwise. It has been variously characterized as "a political football," "a boon to the state," "a white elephant"; and these conflicting opinions forced their way into every political campaign. The quality of cement has been criticized and defended, the price at times has been held excessive and higher than that charged by private manufacturers, the cost of manufacture has been condemned as exorbitant, and the convict-labor principle has been condemned in a continuous barrage of charges and countercharges which have clouded the real facts at issue.

But there is little necessity for becoming involved in controversy or figures concerning the Michigan plant. Responsible state officials concede its failure and are casting about for some method of disposing of it. Last year, State Treasurer Frank McKay submitted to the state administrative board a recommendation that the plant be sold, since the records of his office showed that on July 1, 1930, the plant was $742,295 "in the red."

Governor Green, who was then in office, summed up the situation in a statement appearing in the *Detroit Free Press* of July 1, 1930, in which he said:

"The plant cost $500,000 and another $200,000 has been spent. The cost was to have been met by the plant's profits, but there has been nothing but an annual deficit since."

A more recent editorial in the same newspaper, under the date of January 17, 1931, seems to express the sound opinion of the state. The editorial concludes with the following language:

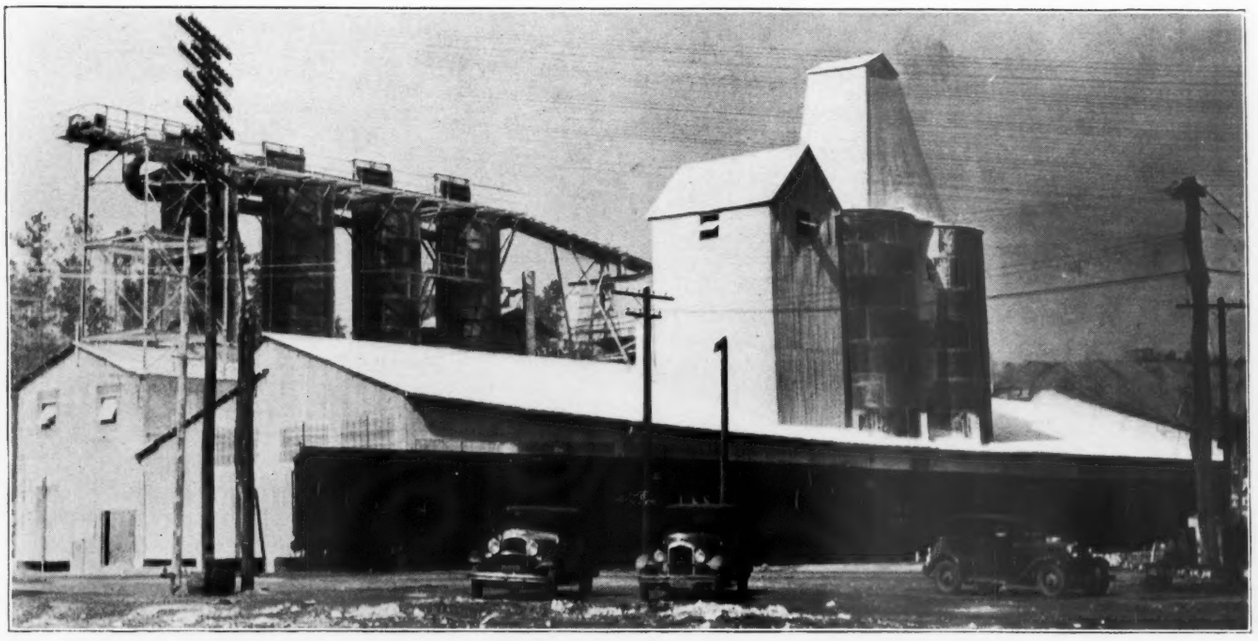
"The plant has been a hundred-per cent liability from the beginning and has cost the taxpayers a good many hundreds of thousands of dollars.

"It is not so very many months since Governor Green admitted that the Chelsea cement plant constituted one of the real puzzles of his administration which he has been unable to solve. The legislature is in a different position. It has the power, at least, to junk the shebang, write it off as profit and loss, and so prevent further drain."

The South Dakota experiment is not so unquestionably a failure. Certain of its sponsors and—fairness compels me to admit—many of the citizens of the State still cling to it as of some value. In certain official quarters, it is stated that the South Dakota plant has not lost money but, unless the best auditing advice I can secure is inaccurate, this plant has cost the state upwards of $400,000 in losses.

Before presenting the figures which prove this serious loss, a word about the history of the plant seems pertinent. It had its genesis in the Non-Partisan League movement in South Dakota. In 1917, the legislature authorized the submission to the voters of an amendment to the constitution establishing a state-owned plant. This amendment was carried by a popular vote and a cement commission was appointed and allotted $25,000 to explore materials and investigate sites. A bond issue of $1,000,000 for building and operating the plant was authorized and this issue was later increased to $2,000,000. Construction was begun at Rapid City in 1923 and the plant was in partial production in 1924. In 1925 an additional $275,000 was appropri-

(*Continued on page 74*)



The Saginaw Lime & Stone Co. plant. Vertical kilns at left, bulk-lime storage silos at right.

Lime Producer at Saginaw, Ala., Adopts Natural Gas for Firing Kilns

Crushed-Stone Plant Now Being Erected at One of Pioneer Operations in South

WITH the approach of natural-gas pipe lines to almost every industrial point in the central, eastern and far-western sections of the country, many leading industries are adopting this excellent fuel for an almost endless list of uses. It is only logical that natural gas should find its way into the non-metallic mineral industries. At present, numerous lime plants are using it with marked success.

In the Birmingham, Ala., district are several model installations of natural-gas firing. The Saginaw Lime & Stone Co. plant at Saginaw is probably the most outstanding of them, and it is significant that this plant, which has been producing lime since 1874, has successively used wood, coal, producer gas and now natural gas for its eight kilns.

Probably the proximity of a natural-gas pipe line to this plant, and the resulting economy that would attend the use of large volumes of the fuel were the underlying reasons for the adoption of this method of firing, but other features added weight to this change.

That the adoption of natural-gas firing at this plant is no reflection on the producer-gas system formerly used is made clear by the president of the company, J. B. Adams, who said, "Our system of producer-gas firing was entirely successful but, with the coming of natural gas, the reduced cost, as well as the smaller number of men required to operate, led us to make the change." The entire producer-gas equipment remains intact with its connections to the kilns undisturbed so that it may be used if necessary.

The original plant of the Saginaw Lime & Stone Co. was built in 1874 at the time a railroad line was projected through this region by Jim Reynolds. When it was acquired by Mr. Adams in 1887, a hydrating plant was added, the first of its kind in the South. For many years two plants were operated, one at Longview, the other at Saginaw—about a mile apart. About three years ago, the principal equipment of the Longview plant was moved to Saginaw and added to the plant there, thus enabling an increased production capacity at the latter plant with its open-pit quarry. Operations at the Longview quarry had continued to a point at which further work required mining at a relatively high cost.

And now another major improvement is underway at the Saginaw plant—the construction of a crushed-stone plant including a modern tipple and car-loading bins. Foundations are already poured and several carloads of timber have arrived. In a few months active production of crushed stone will begin.

The new tipple will be built of timbers and will have a storage capacity of 320 tons in its four bins. Each bin will be 16 ft. wide by 48 ft. long with an effective height of 16 ft. The principal mechanical

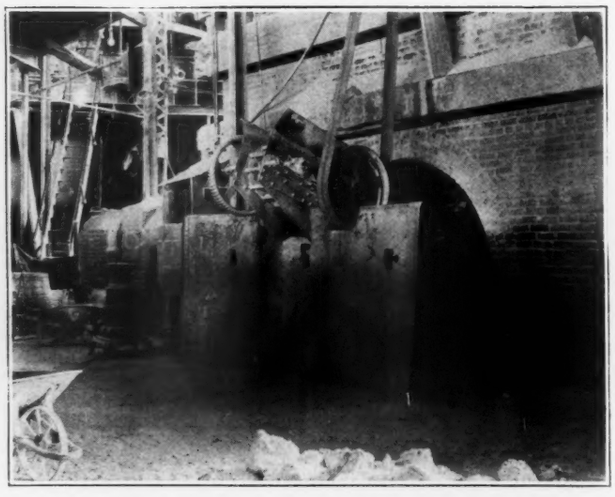
View in the quarry. Loaded cars ready to be hoisted.

Looking down the incline into the quarry.

units are already on hand or in transit. A scalping screen will reject spalls above 9 in. in size to a 30-in. by 13-in. jaw crusher. Final classification will take place in a 60-in. by 30-ft. rotary screen which will separate the material into five sizes of spalls and refuse. The plans call for the production of lime spalls only, but sufficient space has been allowed for the possible production of commercial crushed stone. Paul Wright & Co., consulting engineers, Birmingham, Ala., designed the new plant. The normal daily capacity is designed for 500 tons.

The Saginaw quarry has been opened to the extent of three acres and has two levels, one about sixty feet, the other about eighty feet below ground-level. Stripping is done by colored labor using mule-drawn carts to carry the overburden to a waste dump.

Because of the angle of repose of the rock strata (45 deg.) drilling operations are difficult. To support the driller with his Jackhamer, notches are cut in the top slab and holes are drilled in the standard bench fashion. The holes are drilled on 10-ft. centers, about five feet back from the face, and usually to a depth of 20 ft.—depending on the stratum encountered. Usually, 15 holes are fired to a shot, and Du Pont gelatin, 40-per cent strength, is the explosive medium.



Mechanical drawing equipment on the brick kilns.

The blasted rock is loaded by hand from a number of points on the quarry floor into Koppel quarry cars of which there are 21 in use, each having a capacity of 4,200 lb. of rock. A single hoist located above the kilns at a distance of 1,750 ft. from the quarry floor draws a train of 5 cars to the charging floor above the kilns.

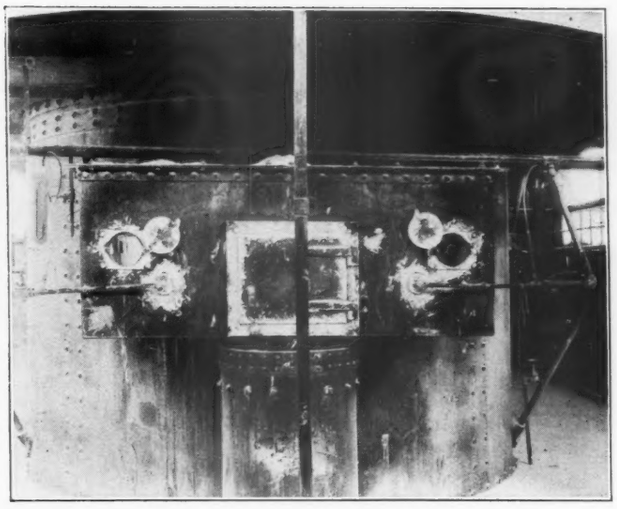
Upon the completion of the screening plant, the kilns will be charged with a graded rock from the screening plant bins instead of directly from the quarry. It is obvious that a more uniform product can be secured through the burning of spalls of uniform size. With the spalls coming from definite-size screen panels, an increase in the kiln production seems possible for the same amount of fuel. It is planned to fire any one grade of spalls in each kiln, thereby using all available sizes.

Kiln-discharge gates with pan conveyor below.

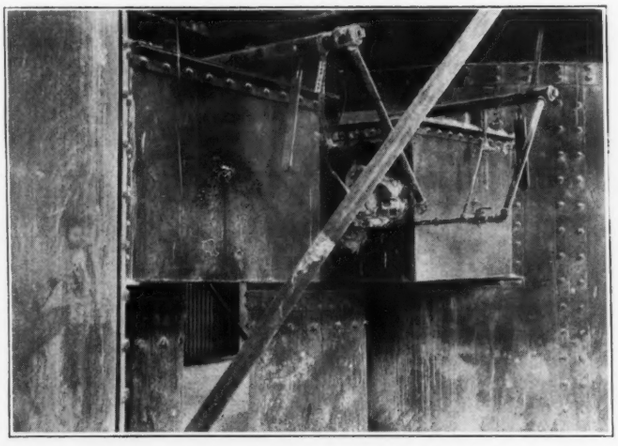
There are eight kilns in the present plant. Four are of brick construction, the other four of steel-jacket construction. The four brick kilns were the original ones at the Saginaw plant; they are 30 ft. high and 8 ft. in inside diam., and are built with square exteriors. Their construction intended them for coal or wood firing, using the double-eye or the 4-arch type of firing chambers. Since the installation of the natural-gas burners, the four kilns are

fired by the latter method. The burned lime is drawn from the bottom of the kilns mechanically through the use of a Montgomery Coal Washing Machinery Co. kiln-drawer which is simply a 10-in. drag-chain suitably mounted on a steel framework and powered by a 7½-hp. motor. The drawn lime discharges over a screen to separate fine particles from the lumps. With natural-gas firing, these kilns average 15 tons daily production.

Mr. Adams invited Wm. J. Kuntz, vice-president, treasurer and general manager of the McGann Mfg. Co., to make a survey of his operations at Longview and Saginaw. Mr. Kuntz recommended that the plant at Longview be dismantled and removed to Saginaw to centralize the operations. The principal reason for the removal was to overcome a four-mile haul of limestone to the Longview kilns.



Burner and piping installation for natural gas.



Natural-gas piping arrangement at the kilns.

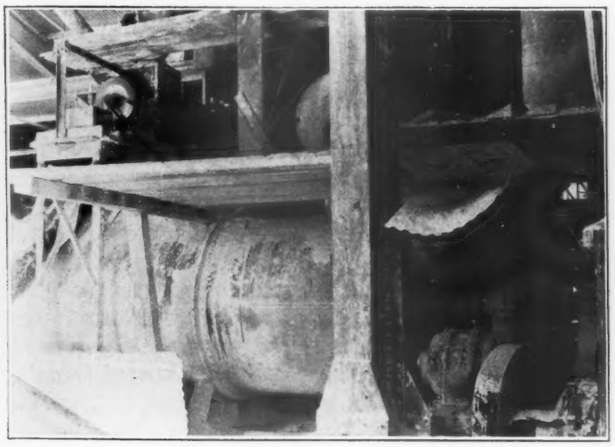
Accordingly, the four shaft kilns at Longview were removed to Saginaw, remodeled and erected as a producer-gas operation, each kiln being increased in height from 47 ft. 10 in. to 60 ft.

The four steel-jacket kilns, as now erected, are 11 ft. in exterior diam. and 7 ft. in interior diam. The lining is a sand rock quarried from Shades Mt. and furnished under an outside contract. These four kilns were rebuilt by the McGann company with an R. D. Woods Co. gas producer and a pan conveyor for the handling of the drawn lime. For draft control when the producer-gas was used, an exhaust fan was installed on the charging floor above the kilns. This fan, an American Blower Co. unit driven by a 20-hp. motor, withdrew the smoke and gases from the kilns through a breeching and discharged them through a single stack. Since the installation of the natural-gas firing equipment, this fan is used only occasionally when small spalls are being burned. To permit rapid charging, a special large door was built for each kiln, counter-balanced for easy raising. This was part of the equipment as designed for use when burning producer gas.

As stated, the plant was built with the Woods producer-gas equipment. This machine received coal from a large steel overhead bunker which was filled by a bucket elevator. The producer discharged the gas through a 48-in. duct which led to the kilns. Each kiln was fired from two points opposite each other through a branch from the main duct. For the natural-gas firing, this equipment remains intact, the only changes made being the cutting of small holes to accommodate the burners.

Essentially, the natural-gas-burning equipment

The two batch hydrators equipped with dust hoods.



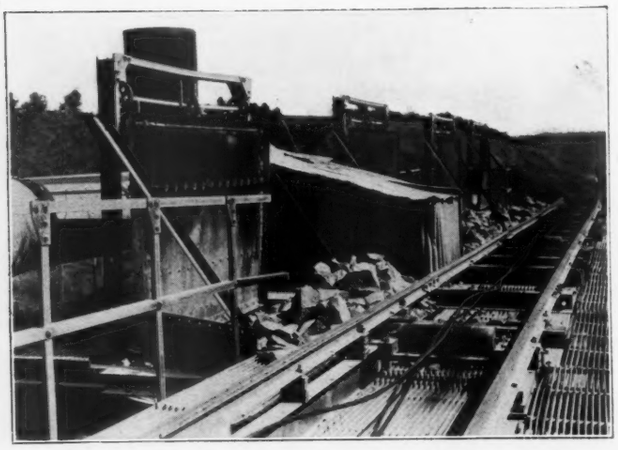
One of the hydrators now used to cool the lime.

is simple. The gas is brought to the plant through a 6-in. pipe to a meter house. Here two meters are installed with two pressure-reducing valves, all inclosed in a neat steel building which is located some distance from the buildings. The gas pressure at the entry to the meter is approximately 250 lb., while, after leaving the reducing valves to the plant, it is about 45 lb. per sq. in. At the charging floor, another reducing valve in the pipe line reduces the pressure to 1½ in. of mercury. From this point, a 3-in. header extends to the four kilns, and branch pipes to each kiln are taken from it. Four burners, two on each side, send the gas into the firing zone. Each burner consists of a 3-in. pipe 42 in. long extending into the furnace arch. The gas enters the burners through a small ½-in. pipe which is inserted but 12 in. into the burner pipe. For the regulation of the gas, a stopcock is placed in the ½-in. line and the pressure is gauged by a manometer which reads in inches of water. From 3 to 7 in. of water is the pressure usually carried. The flame is adjusted by means of the air orifice. When the opening is enlarged or reduced, the flame burns lower or higher in the firing zone.

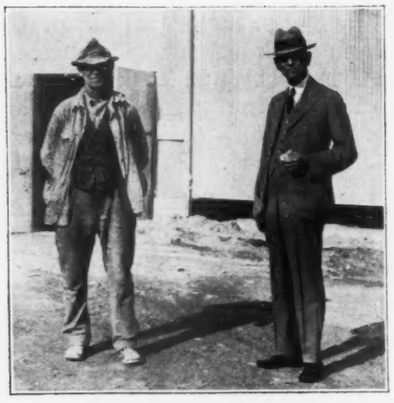
As to the characteristics of this type of burning and the relative costs at this plant, experience has proved that 4,300 cu. ft. of natural gas are required to produce one ton of burned lime when using a gas averaging 1,000 B.t.u. per cu. ft. With a sliding scale for the purchase of the gas, the actual cost approximates $1 per ton, which is somewhat cheaper than when firing with coal. Other important advantages of natural-gas operation are in the saving of labor costs. Fewer men are required to operate the kilns; in fact, the process requires little or no attention. Furthermore, the furnaces do not require periodic cleaning as they do with a coal fire, and the produced lime is somewhat cleaner and freer from clinkers.

Beneath the kilns and between their concrete foundation piers, a Jeffery 30-in. pan conveyor receives the burned lime. Each kiln has a spreading-type conical bottom manipulated through a rack-and-gear mechanism. From the first conveyor, the lime is transferred to another of similar size leading to two Sturtevant mill crushers. The first conveyor is driven by a 15-hp. motor and the second by a 7½-hp. motor through a Jones speed reducer.

The two crushers are used optionally as required, one being set at 4 in., the other at 2 in. Each machine is driven by a 15-hp. motor. From the crushers, the lime is sent to an elevator, also made by the Jeffery Mfg. Co., which sends the bulk lime to either of two steel storage tanks. These tanks are



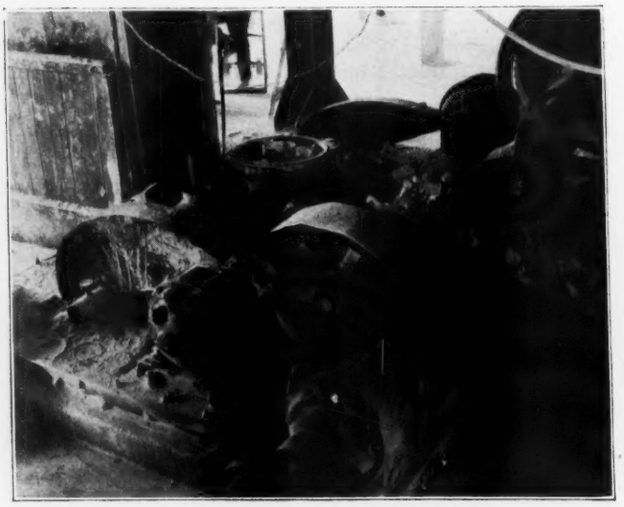
View on the charging floor. Note counter-balanced doors.



E. M. Confer, superintendent, and J. B. Adams, owner.

A group of employees of the Saginaw lime plant.

Natural-gas meter house located on the property.

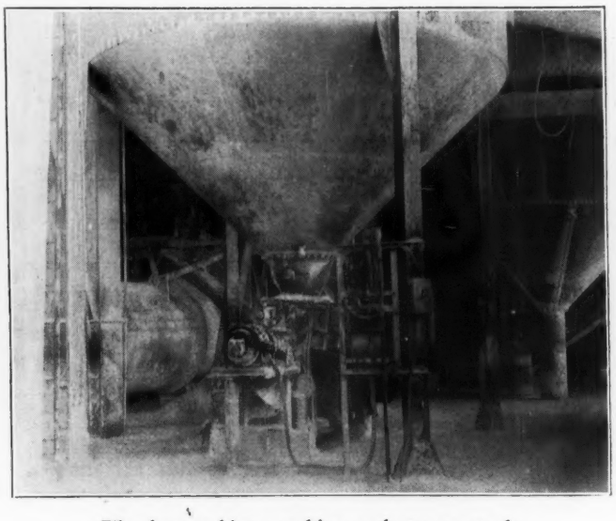


Pan conveyor bringing lime to the crusher.

Construction in progress on the new tipple.

20 ft. in diam. and 35 ft. in height, with conical bottoms terminating in bag-filling gate valves. Each tank has a capacity of 4,000 bbl. of lime. Boxcars can be loaded from the tanks, spouts leading to the car-loading platform for this purpose. A Link-Belt loader equipped with an 18-in. canvas belt assists in the rapid loading of the cars. The lump lime is also shipped in steel or wooden barrels. The company maintains its own cooperage plant for the manufacture of the wooden barrels.

For the production of hydrated lime, an auxiliary tank, with a storage capacity of 550 bbl., receives the fine material from a screen at the head of the bulk-lime elevator. The screenings are spouted to the auxiliary tank and thence to two Clyde No. 3 hydrators. These hydrators, which are now being manufactured by the Blaw-Knox Co., produce the hydrated product continuously, discharging directly into the boot of a Jeffrey 32-ft. elevator, with 6-in. by 8-in. buckets. It sends the material into a Schulthess hydrator which is used as a cooler. After the hydrated lime passes through the Schulthess unit it is again elevated, this time to a Gayco mechanical-air separator located above the finished-material tank. The elevator is a Jeffery unit, 60 ft. high and driven by a 10-hp. motor. The separator returns the heavier material to the beater-mill above the Schulthess hydrator, while the fines pass directly to the finished-material storage tank.



The bag-packing machine and storage tanks.

Three brand names are used in marketing the hydrated lime: White Rose, White Lily, and Creamolime. All three brands are sold in Bates multiwall bags, filled by a Bates 4-bag packer. During normal operation, the daily capacity of the plant is 100 tons of finished bulk and hydrated lime.

General Electric Co. motors and control apparatus are standard for all the mechanical equipment.

The company maintains a commissary for the 135 men on the payroll. This division of the company's activities is, in reality, a general store, catering to every need of the employee and his family.

Diatomite as Filler in Battery Boxes Finds Growing Use

The Bureau of Mines recently has issued a general information circular covering briefly the origin and occurrence, properties, uses, exploitation, and marketing of diatomite. Since this publication was prepared, additional information has become available regarding one of the newer uses of diatomite—that as a filler in battery boxes.

The consumption of diatomite as a filler in the manufacture of battery boxes has increased to such extent that present consumption is at least 10,000 tons per year and may exceed 15,000 tons.

Manufacturers report that diatomite of good quality is a very efficient filler and an ideal material to use. It must, however, conform to somewhat exacting standards and the specifications vary among the different companies. In general there should be not more than 8 to 10 per cent acid-soluble material. One company uses a hot dilute sulphuric-acid solution for this test. The iron content must be low, usually less than three-fourths of 1 per cent. Manganese and magnesia also are said to be objectionable. Material must be low in other impurities such as clay and organic substances and must in some cases correspond to type samples in regard to fineness, loss upon ignition, oil-absorption properties, and microscopic examination.

Improvements Increase Dewey Output

(*Continued from page 55*)

clinker has remained consistently low as indicated by soundness tests on pats and occasional analyses.

The figures below represent average tensile strengths, before and after the installation. Not a great deal of attention has been given, so far, to building up the strength to the ultimate which can be secured, so these comparative figures indicate only the trend which is obviously in the right direction.

TENSILE STRENGTH—LB. PER SQ. IN. ON 1-3 MIXES WITH STANDARD OTTAWA SAND

	1 Day	7 Days	28 Days
Open Circuit			
Jan., Feb., Mar., Apr.	128	330	430
Closed Circuit			
June, July, Aug.	178	356	451

Still higher strengths are expected.

Problems of Traffic Management in the Lime and Gypsum Industries

By J. F. CHAMBERS

THREE problems which most frequently confront the traffic managers of lime and gypsum producers are, (1) securing freight rates that will allow their companies the widest possible market, (2) the elimination of loss and damage claims, and (3) the use of motor trucks in making deliveries.

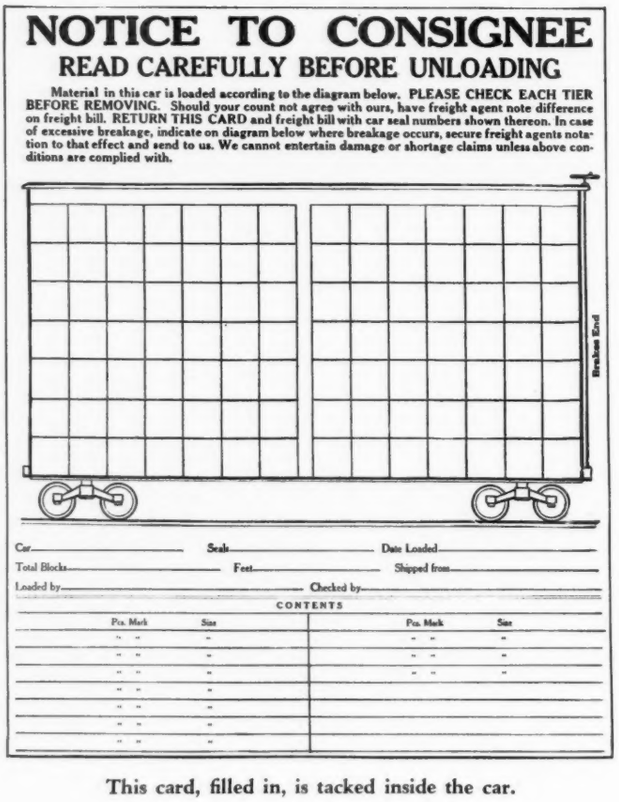
One common method of quoting freight rates to the sales department is to make sheets showing the rates to the markets covered by the company, with the destinations arranged in alphabetical order. As these sheets do not usually cover every destination in the territory, a master rate sheet should be kept in the traffic department for each railroad with the stations in geographical order, and showing the rates from all competing mills as well as the rates on the various products shipped by the home company. This will make easier the application of the intermediate clause if it is carried in the tariff. If commodity rates are not applicable to every destination in the territory, application for rates on the proper basis should be made immediately and followed up vigorously until the rates are published. The rates committees and the traffic departments of the railroads are crowded with work and it is easy to sidetrack a rate application if it is not followed up properly.

This procedure may save considerable embarrassment and perhaps the loss of business later. For example, a centralized school may be built at a small or supposedly unimportant station and the order for plaster or lime may be received only a short time before a shipment is to be made. The use of lime and gypsum in agriculture is growing rapidly and a large percentage of this traffic moves to small towns or even to non-agency sidings in the country. No point of destination, regardless of how small, should be overlooked in making rate applications.

To make rate applications on the proper basis is, in itself, quite a problem unless a definite basis has been established by the federal or state commissions or by a group of shippers. Definite interstate bases on lime and gypsum have been established in central and eastern territories on interstate traffic but this is not generally true in other sections of the country.

If there ever was a time when the carriers sought to make rates that would favor shippers on their own lines, that time is passing if it has not already passed, and this condition will obtain to a greater extent as the railroads consolidate. If a carrier were to publish rates on a low basis on lime or gypsum for one shipper, the other shippers on the line would demand the same basis, so that only the very small roads could follow this procedure and even they would meet strong opposition from the larger roads. A careful study of the rate structures prescribed by the commissions or established by the rate committee and a careful analysis of the rates from every competitive point are necessary before making applications for commodity rates. This study and the analysis should convince traffic men who have commodity rates to most destinations in their territory that they are entitled to some revisions in their rate structure.

While the keynote of modern business is coöperation, many traffic men in the non-metallic minerals industries have failed to grasp the meaning of the word. Recently a downward revision of the rates on one product of this industry was docketed for consideration by a rate committee. The number of interested shippers was extremely large. The writer remarked to a railroad traffic official that the roads would have their hands full in maintaining the present structure with all the apparent opposition. The traffic man laughingly replied that there would be no trouble at all so far as the railroads were concerned; that each shipper would wish to protect his own near-by markets and yet invade the near-by markets of his competitors; that the shippers would not agree on what they wanted;



NOTICE TO CONSIGNEE

READ CAREFULLY BEFORE UNLOADING

Material in this car is loaded according to the diagram below. PLEASE CHECK EACH TIER BEFORE REMOVING. Should your count not agree with ours, have freight agent note difference on freight bill. RETURN THIS CARD and freight bill with car seal numbers shown thereon. In case of excessive breakage, indicate on diagram below where breakage occurs, secure freight agents notation to that effect and send to us. We cannot entertain damage or shortage claims unless above conditions are complied with.

Brake End

Car _____ Seals _____ Date Loaded _____

Total Blocks _____ Feet _____ Shipped from _____

Loaded by _____ Checked by _____

CONTENTS

Pcs. Mark	Size	Pcs. Mark	Size
" "	"	" "	"
" "	"	" "	"
" "	"	" "	"
" "	"		
" "	"		
" "	"		
" "	"		

This card, filled in, is tacked inside the car.

NOTICE TO CONSIGNEE

READ CAREFULLY BEFORE UNLOADING

Car No._____ Initial_____ Date Loaded_____ 192__

THIS CAR CONTAINS

Cloth bags_____ Block_____

Paper bags_____ Plaster Board_____

Barrels_____

LOADED AS FOLLOWS

		BAGS	BOARDS	BLOCKS
THIS END				
____ Piles ____ Each ____		Total____	____	____
OTHER END				
____ Piles ____ Each ____		Total____	____	____
CENTER				
____ Rows ____	____	Total____	____	____
	TOTAL	____	____	____

Special Notice } In plaster board shipments, the imperfect or broken boards placed on edge between piles are used for dunnage and are not counted nor charged for. DON'T DRAG BAGS OVER FLOOR. NAILS AND BOLTS PROTRUDING WILL TEAR BAGS.

SHIPPED FROM_____ LOADED BY

Bags_____ _____

Boards_____ CHECKED BY _____

Blocks_____ _____

TO OUR PATRONS:

Should your count not agree with ours have railroad agent note difference on freight bill and obtain car door seal numbers from him, **RETURNING THIS CARD** with freight bill attached and car door seal numbers shown thereon. We cannot entertain claim for shortage unless above is observed.

This form is sent to the purchaser.

and that nothing would be accomplished. And that is exactly what happened. The place and the time to thresh out differences of opinion between competing shippers is at a meeting of shippers only before the proposal is heard by the rate committee. This, of course, applies only to shippers in the same rate-committee territory.

Some thought might well be given to the growing tendency to publish lime and gypsum rates on a mileage-scale basis, and the desire of some railroad traffic officials to make all commodity rates on the basis of a percentage of the first-class rate.

The traffic manager of one of the leading gypsum companies has solved the problem of loss-and-damage prevention, and reports that claims are negligible. In the first place it is necessary that the railroad furnish the proper equipment and that it be in proper condition to load. Some of the regional advisory boards have standing committees on cleaning cars and, no doubt, much has been accomplished through their efforts. The fact remains that some of the roads still furnish cars which are not in proper condition for loading lime or gypsum products. This is especially true at points served by only one road where there is no competition for the traffic. The traffic manager mentioned above has instructed his plants to refuse cars which are not suitable for loading. Under present conditions there is really no reason why a shipper should spend one cent for cleaning or repairing cars.

He has established a rule which might well be copied by all traffic men, and that is that the claim-prevention officials of the railroads are always welcome at any of his plants and that any loading or packing suggestions they can make which will result in less damage to shipments will be welcomed.

Since the total loss, including the disappointment and inconvenience to the dealer or contractor, cannot be recovered, an ounce of claim prevention is worth several pounds of claims paid. The results obtained by some railroad claim-prevention committees are really remarkable and the amount of claims paid on lime and gypsum products would indicate that it might be profitable to some of the mills that are sustaining losses on damaged shipments to invite one of these committees to assist in the solution of this problem.

The Illinois Central Railroad has prepared a motion picture showing the right and wrong ways of packing, loading and handling various kinds of freight. This picture, which is being shown to employees over the entire system, indicates that the company is intensely interested in claim prevention, while some of the scenes show the results of years of experimentation in the best methods of packing and loading.

One source of trouble is the use of paper bags that are not properly glued, or cured, that are made of paper that has insufficient weight or strength, or that are too small. The bags may not be too small at the time they are filled but the contents may swell and burst the bag either in transit or in the dealer's warehouse. Some kinds of lime, even though thoroughly hydrated, will swell if subjected to the heat and humidity found in a dealer's warehouse on a hot summer day sufficiently to burst a bag which was filled to the limit at the plant on a cold day. While a small well-filled bag has a better appearance, it is better to use a bag which is large enough to allow for normal expansion.

No definite rule can be established covering the best material to be used for lining cars. One gypsum company has found that chipboard serves its purpose to the best advantage, while some producers are using heavy rag or kraft paper and some a very tough paper made of two sheets of kraft paper held together by an asphaltic composition. The proper material to use will depend, to a great extent, on the cost at the plant but it should be tough enough to prevent penetration by nails in the sides and floor of the car.

Bags should never be placed nearer than nine inches from the door of a car and should always be cross-piled and pyramided to prevent shifting against the door while in transit and the subsequent tearing of the sacks when the door is opened.

Many companies have found it advantageous to issue a card showing the diagram of the loading and the number of sacks in each row or tier. This card is tacked on the inside of the car near the door and is used by the dealer to check the load as it is removed from the car. In case of any shortage the card is returned to the shipper with a notation as to just where the number of sacks found failed to tally with the number shown on the card. One shipper has the cards padded with alternate sheets of light weight paper printed in duplicate form, using carbon paper, and filing the original sheet. This form shows the initial and number of the car,

the date and time the loading was started and finished and the names of the men who loaded the car.

The use of multi-wall bags would reduce the breakage to some extent but it is doubtful whether this saving would be sufficient to justify the additional cost of the bags for ordinary shipments.

It is a common practice to include in each shipment a few empty bags to take care of possible breakage. The so-called overslip bag, which is slightly larger than the regular bag and can be slipped over a torn bag without removing the material, is best adapted to this use. Only a few extra bags should be included, for, if the shipment is properly packed and loaded, there will be little need for them. This item will run into considerable money during the course of a year.

A dealer in a town in Indiana recently found that he needed a small shipment of material the next day to fill an important contract. He called the sales department of a manufacturer in Chicago and explained the situation. The goods were in the mill in Ohio and the traffic manager was given the job of getting this shipment moved to the customer in Indiana, some hundred miles away. This order was received late in the afternoon and, much to the customer's surprise, a truck was waiting to unload the goods when he arrived at his office the next morning. Not only was the customer completely satisfied but the story of this extraordinary service spread to the adjoining states and resulted in increasing that intangible and priceless asset, good will.

Deliveries of lime and gypsum products by truck for distances up to sixty miles are not unusual. This method is especially desirable in the cases of small dealers who do not wish to stock a full carload, and it insures a fresh stock on hand at all times. It is also quite an advantage to farmers living within trucking distance of the mill, as agricultural lime or gypsum can usually be delivered to the farmer's barn for about the same cost as to the dealer's warehouse.

The question of who should own and operate the trucks depends on several factors. The availability of capital for the purchase of the trucks, the cost of the trucks, the cost of operating, maintaining and storing them, will weigh against the advantage of having unquestioned control of the trucking facilities at all times. On the other hand, there are usually independent truckers who will handle shipments at the regularly established freight rates or even less. They are generally willing to work long hours and to perform unusual services. One truck owner operating three or four trucks and serving a plant of one of the gypsum companies has found it profitable to solicit business from dealers within trucking distance of this mill. He has opened some new accounts which the salesman had been unable to sell. He frequently loads his trucks in the evening, starting his trips at whatever time during the night will enable him to arrive at the dealer's warehouse by opening time the next morning. The service is performed at approximately the carload-freight rates, to the satisfaction of the mill, the dealer and the truck operator.

Progress in Research on Concrete Aggregates Reported

The subcommittees of committee C-9 on concrete and concrete aggregates reported considerable progress at the meeting of that committee held in Pittsburgh in conjunction with the group meeting of A. S. T. M. Committees recently.

The subcommittee on strength tests of concrete conducted a survey of 56 testing laboratories to determine the advisability of raising present temperature requirements for storage of concrete and mortar specimens. The results of the survey indicated that present requirements should be retained. It was felt that a higher temperature would result in greater variations in temperature than a proper regulation of present requirements.

The subcommittee on measurement of materials, mixing and placing of concrete presented two important reports, one covering the determination of materials in freshly-mixed concrete and the other, a method for determining the amount of materials in hardened concrete. It is expected that the latter method will be recommended to the Society for publication as tentative.

The subcommittee on specifications and methods of tests of aggregates reported on the requirements of quality and uniformity of fine aggregate and on a new method of test for determining the apparent specific gravity of coarse aggregate in the saturated condition. The committee is undertaking a study of the effect of rate of freezing on the freezing-and-thawing tests, and a study to determine the necessity of using pure sodium hydroxide in the performance of the color test for organic impurities.

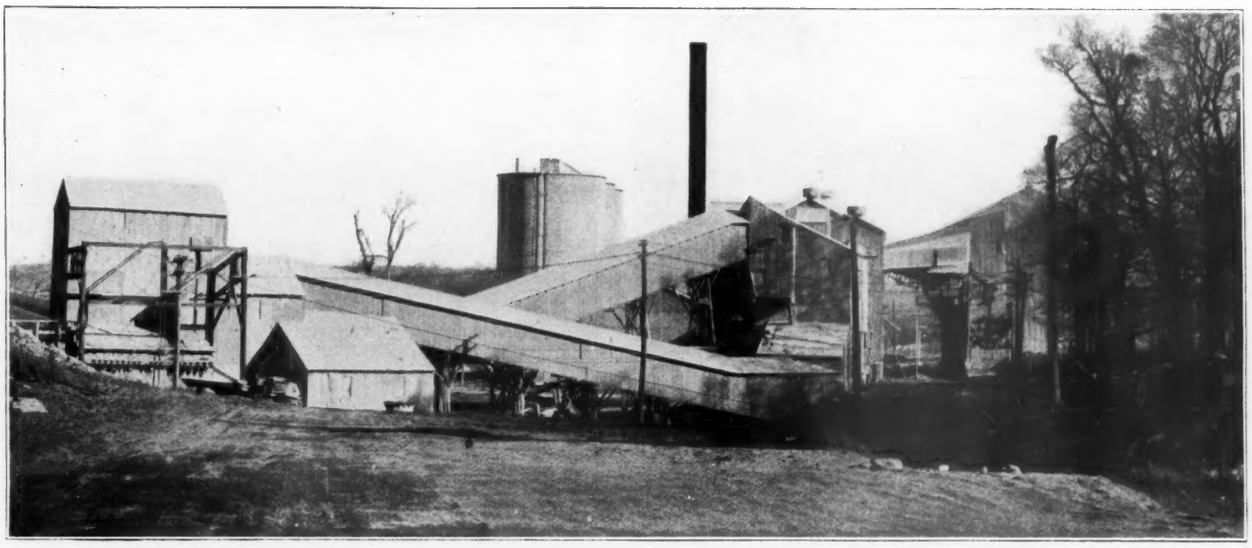
Specifications for curing of concrete were presented by the subcommittee on curing and proposed as tentative standards. These cover:

1. A general specification for curing, including cold weather curing.
2. Curing with wet coverings.
3. Curing with bituminous coverings.
4. Curing with surface application of calcium chloride.
5. Curing with calcium-chloride admixture.

The subcommittee on elasticity and volume changes of concrete was instrumental in having presented a paper on "The Effect of Aggregate and Other Variables on the Elastic Properties of Concrete," by P. M. Noble.

The newly-organized subcommittee on ready-mixed concrete has under way the preparation of a specification which it is hoped will form the basis of a purchase specification for ready-mixed concrete designed on the basis of (1) arbitrary proportions (2) water-ratio method (3) strength.

The technical subcommittee proposes to conduct an intensive study of the limitations and significance of test results in determining the qualities of concrete.



Plant from west with crusher building at left and concrete storage silos in background.

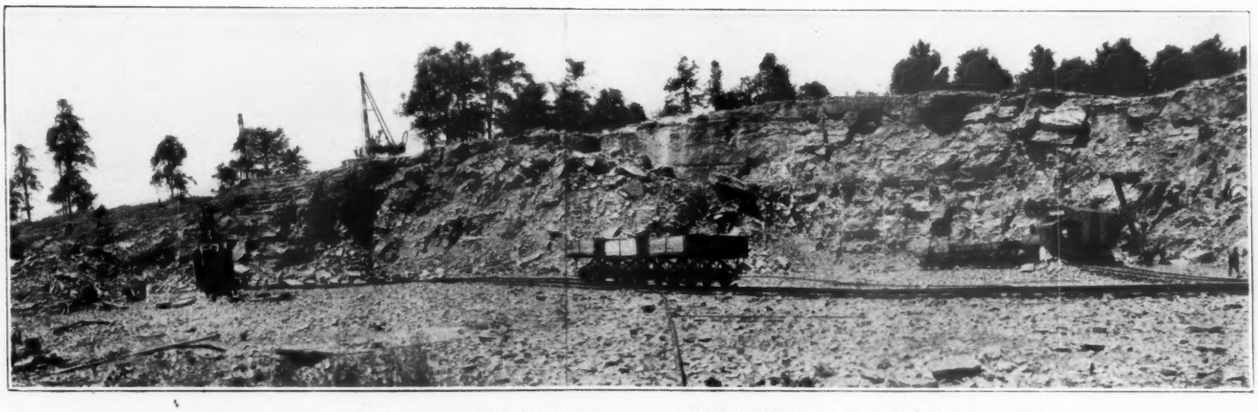
New York Lime Plant Adds New Packing, Storage and Conveying Units

Soil-Improvement Value of Agstone and Lime Determined on Experimental Farm

By W. E. TRAUFFER

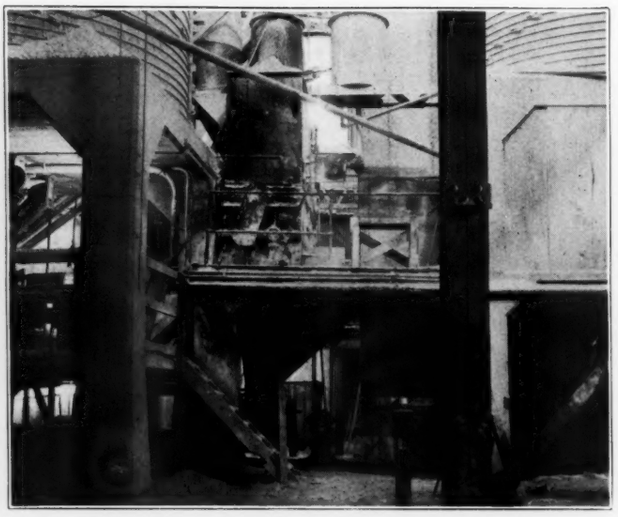
ONE of the few important developments in the lime industry within the last year was the improvement by the Mohawk Limestone Products Co. of its plant at Jordanville, N. Y. This plant is located in the hill country south of the historic Mohawk Valley and is 30 miles southeast of Utica. The company owns one of the largest limestone deposits in the state and produces crushed stone, pulverized limestone, agricultural and masons' hydrated lime and quicklime. The company also operates a 155-acre experimental farm near the plant where tests are conducted with the company's own products. An example of the productivity of limed soil was a recent crop of 1,800 bushels of potatoes grown on six acres of ground.

The plant was originally built in May, 1925, and has been enlarged or improved a number of times since. The latest and most important improvement was the completion, early in 1930, of a new concrete silo storage unit, a packhouse, and a Fuller-Kinyon pumping system. The raw-material storage capacity was increased at the same time. All this work was designed and erected under the supervision of D. W. Finch, general superintendent, who also built the original plant and has had charge of all subsequent improvements. The new storage silos were erected by M. A. Long & Co. Most of the conveyors and elevators in the plant were furnished by the Link-Belt Co. and Goodyear conveyor belting is used exclusively. The plant has an hourly capacity



Quarry view with shovel at right loading to cars. Well drills at work in left background.

The 4-ft. by 8-ft. ball mill used for pulverizing limestone. Screw conveyor discharge at left.



The hydrator with weighing and water tanks above. Quicklime hopper and feeder at left.

of 200 tons of commercial stone, 12 tons of pulverized limestone and 5 tons of hydrated lime.

The property owned by the company comprises a total of 250 acres, 50 acres of which are high-grade limestone suitable for both lime and aggregate. There is very little overburden to be stripped from the deposit and this is carefully removed by hand labor. Drilling of blast holes is done by three 6-in. well drills—one gasoline-driven Keystone and two electrically-driven Sanderson Cyclones. The quarry face varies from 40 to 60 ft. in height and single-row bank shots of from 30 to 55 holes are made. The initial shot of 54 holes for 1931 was drilled in the fall of 1930 and detonated early in the spring of this year. This shot brought down an estimated 100,000 tons of stone. Atlas 40- and 60-per cent dynamite and Cordeau-Bickford safety fuse are used. Comparatively little secondary drilling is necessary but this is done with Ingersoll-Rand Jackhamers.

The stone is loaded by two Marion 37 electric shovels to Western 6-cu.yd.-capacity side-dump cars. These are hauled a distance of about 1,000 ft. to the plant by two Vulcan 20-ton steam locomotives and one Vulcan 16-ton gasoline locomotive. The use of three locomotives insures a steady supply of cars to the shovels at all times.

The cars are dumped at the plant by a Curtis air-hoist, over a rail grizzly, directly into the Allis-Chalmers McCully 30-in. gyratory primary crusher. An Ingersoll-Rand air-hoist connected to a stone-hook handles large stone. The crusher discharge and the stone passing through the grizzly go to an Allis-Chalmers 42-in. pan conveyor which feeds to a live-roll grizzly of the same make. The crusher and pan conveyors are each Texrope-driven by Allis-Chalmers motors of 125-hp. and 50-hp. respectively. The roll grizzly is chain-driven from the head pulley of the pan conveyor.

Two of the double-deck vibrating sizing screens.

The discharge to the primary gyratory crusher.

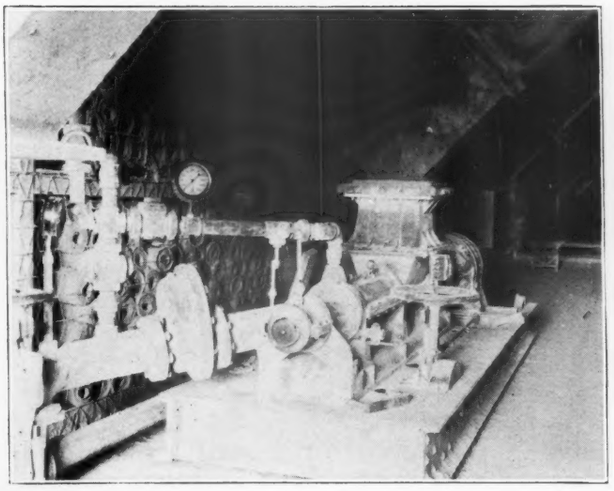
The oversize from the roll grizzly goes through a split chute to two Allis-Chalmers gyratory secondary crushers, one McCully 13-in., the other a Gates 12-in. The fines from the grizzly and the crusher product are taken by the same 30-in. inclined-belt conveyor to the screen room. The two crushers are each Texrope-driven by Allis-Chalmers motors of

100-hp. and 50-hp. respectively. The belt conveyor is driven through tandem gears and Texrope by a 30-hp. motor.

The belt conveyor discharges through a split chute to two Niagara 3-ft. by 8-ft. triple-deck vibrating screens. The decks have 2¼-in., 1¼-in., and ⅞-in. mesh wire cloth. The oversize is returned on a 24-in. belt conveyor to the Gates secondary crusher and back into the circuit. The two larger sizes are chuted directly into bins while the ¾-in. and under drops to another 24-in. belt conveyor. This discharges to two Niagara 3-ft. by 6-ft. double-deck vibrating screens with ½-in. and ¼-in. mesh cloth. Both sizes and the dust go to separate bin compartments. The bin supporting the screening building is of concrete-block construction and has six compartments with a capacity of 50 tons each.

The coal pulverizer and fan used for kiln firing.

A 24-in. horizontal return conveyor under the bins can take any desired size of stone back to the crusher building where it discharges to an Allis-Chalmers 14-in. by 36-in. double-roll crusher. This discharges back onto the main 30-in. belt conveyor to the screening building.

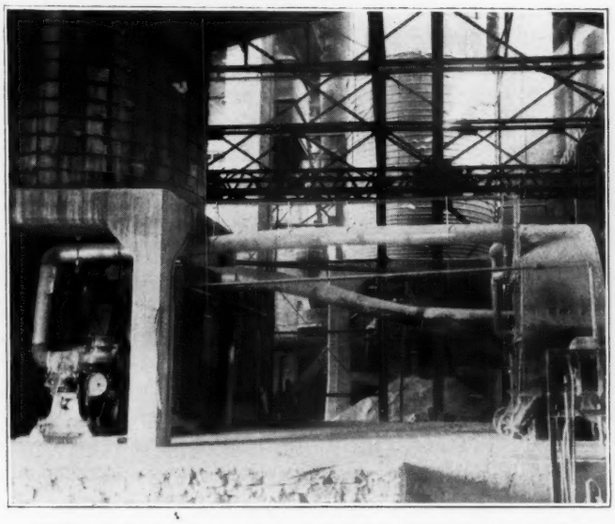


One of the pumps used for loading from the storage silos.

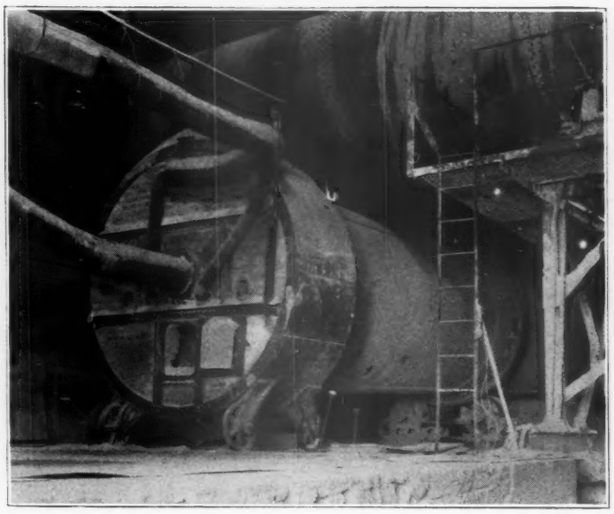
Another 24-in. horizontal belt conveyor under the bins feeds to a 24-in. inclined conveyor to the truck- and car-loading building. This feeds by means of a tripper arrangement to two Niagara 3-ft. by 6-ft. triple-deck vibrating screens with 1¼-in., ½-in. and 3/16-in. mesh cloth. These screens remove all dust caused by previous storage and handling and the decks allow any size to be rescreened.

The bins also discharge through another series of gates onto an 18-in. belt conveyor. This is horizontal under the bins and then inclined to a point where it discharges through a swivel chute to the kiln stone bin, the dust bin, the drier bin, or to the storage building as the case may be.

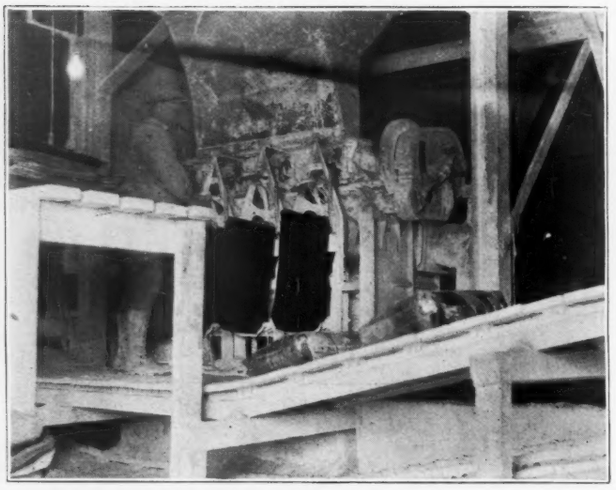
The 18-in. belt conveyor takes stone to a 24-in. belt conveyor in the storage building where it is discharged to any desired point by a movable tripper. The storage building is a large wooden structure 55-ft. wide by 280-ft. long with two sides open at the bottom to allow some of the material to pile up outside the building. It is used only for stone for the lime kiln and dust for the pulverized limestone plant. An overhead gantry traveling crane rehandles the stored material and reclaims it



Firing end of kiln at right; coal pulverizer and bin at left.



The rotary lime kiln with the rotary cooler above.

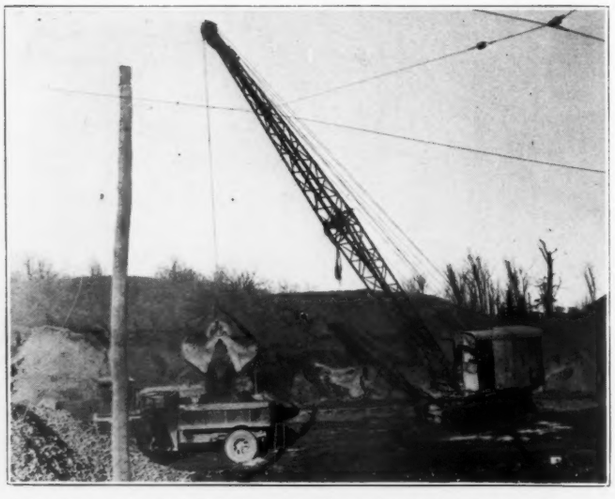


One of the three-bag packers in the new packing building.

onto the same 24-in. belt conveyor which is reversed and discharges by means of the tripper.

When stone for the pulverizing plant is being handled, the tripper discharges to a series of belt conveyors which feed a Ruggles-Cole 5-ft. by 45-ft. direct-heat rotary drier. This discharges by means of a series of elevators and conveyors to a concrete-slab storage silo of 300-ton capacity. Another elevator and conveyor feed from this silo to a Hardinge 4-ft. by 8-ft. ball mill where the stone is ground to 90 per cent through 200-mesh. The pulverized stone is then taken to two Niagara 2-ft. by 4-ft. double-deck vibrating screens. The tailings from the screens are returned by a screw conveyor to the mill. forming a closed circuit. The finished product goes to a Fuller-Kinyon 5-in. pump which transports through a 4-in. line to a concrete storage tank of 8,000-ton capacity. The product can be fed from the screens to a concrete-slab silo feeding a Bates packer for sacking the pulverized stone.

The kiln stone is carried from storage by a series of conveyors to the Vulcan 8-ft. by 110-ft. rotary kiln. This has a capacity of 5 tons per hr. The quicklime drops to a Rex drag-chain conveyor and by bucket elevator to the Ruggles-Cole 6-ft. by 60-ft.



Crane loading from stock-pile to truck for shipment.

natural-draft cooler. This feeds to a concrete-slab silo of 200-ton capacity which discharges through a Raymond feeder and by screw conveyor and elevator to the hydrating plant. The elevator discharges to a weigh hopper feeding the Arnold & Weigel 1-ton Weber batch hydrator. The hydrator turns out a batch every 15 minutes and the feeder, conveyor and elevator are automatically controlled from the scales on the weigh hopper.

The hydrator discharges through a Fred Raymond feeder to a screw conveyor and elevator feeding an air separator. This separates out the 200-mesh lime which is conveyed by a Cyclone collector to a concrete-slab storage silo. A Valve-Bag packer sacks the hydrated lime for shipment.

The coarse lime from the air separator drops to a J. B. Sedbury Co. swing-hammer pulverizer. The discharge is carried in a closed-circuit air conveyor system through another Cyclone collector to a concrete-slab storage silo of 150-ton capacity. A Fuller-Kinyon 5-in. pump carries the hydrated lime

Left to right: Geo. Bondman, crane operator; Arthur Monk, quarry foreman; Geo. Marshall, lime foreman; D. W. Finch, general superintendent; M. W. Finch, engineer; Thos. Hodge; Burton Trautner, electrician; A. J. O'Brien, timekeeper; M. L. Bowers, crusher foreman.

through a 4-in. line to two concrete storage silos of 3,500-ton capacity each.

These two silos and the pulverized-lime storage silo form a storage unit alongside the plant. Each silo is 50 ft. in diam. and 80 ft. high, with an overall height of 96 ft. These are among the largest monolithic-concrete storage silos in existence and are of the few storage units of this type being used for the storage of hydrated lime or pulverized limestone.

Two movable Fuller-Kinyon 5-in. pumps under the silos can be arranged to pump either product to a packhouse nearby. Here they are discharged to a two-compartment steel hopper of 10-ton total capacity. The stone compartment feeds a Bates 3-tube packer and the lime compartment a Valve-Bag 4-tube packer. Each of these discharges to a reversible platform conveyor which allows cars to be loaded on tracks on both sides of the building. Provision is made to pump bulk lime directly into cars from either the hydrating plant or the silos. A Chicago Pneumatic 13½-in. by 8-in. by 10-in. air compressor under the silos furnishes air for the

Fuller-Kinyon pumps. A Buffalo 150-ton-capacity track-scale is used for weighing car shipments.

A considerable supply of sized stone is always carried in stock-piles to satisfy any unusual demands. This is handled to and from the piles by a Lorain 75 gasoline crawler crane equipped with a 50-ft. boom and a Haiss 1½-cu. yd. clamshell bucket. A Baldwin 70-ton steam locomotive is used for switching. Most shipments are made by railroad but a large share of the aggregates is delivered by truck for local road work. The plant is about ¾-mile from the main line of the Southern New York Electric Ry. which is connected to the plant by an electrified siding. This road connects with the New York Central, Lackawanna, and D. & H. railways, giving good shipping facilities in all directions.

Coal for the kiln is dumped from cars on a trestle to a hopper. A drag-chain conveyor feeds to an O. B. Wise pulverizer in the hydrate building which reduces to ¾-in. size and under. The coal is then elevated to a 65-ton-capacity silo which feeds an Aero Type E pulverizer. This reduces to 98 per cent through a 100-mesh screen. The same motor operates the feeder, the pulverizer and the fan which blows the pulverized coal from the pulverizer into the kiln.

Electricity is brought to the plant at 44,000 volts and is reduced at an outdoor substation to 2,300 volts. This voltage is used for all motors of 20-hp. or more. Transformers in various parts of the plant reduce to 220 volts for all other motors and for lighting.

A frame building near the quarry houses the machine and blacksmith shops. This contains an Ingersoll-Rand pneumatic drill sharpener, a forge and other necessary equipment. It also houses an Ingersoll-Rand Imperial Type 10, 8-in. by 13-in. by 12-in. air compressor which is belt-driven by a General Electric 75-hp. motor. A neat 30-ft. by 90-ft. concrete-block building houses the electrical repair shop, wash room, and the general and private offices. A Fairbanks 20-ton-capacity scale is used for weighing truck shipments.

The main office of the company is at 1 East Main St., Mohawk, N. Y. Officers are: A. J. Stratton, vice-president; F. H. Rutschow, general manager; H. L. Buckley, purchasing agent; and D. W. Finch, general superintendent. The company also operates a sand and gravel plant at Bloods Mills, N. Y.

Marble Spalls Supply Raw Material

(*Continued from page 46*)

double that for a coal-burning kiln, and a cleaner and more uniformly burned product.

Considering the burning operation alone, some of its advantages are centered on the introduction of air into the kiln from the kiln bottom. The entrance of the producer gas to the kiln from two points considerably above the bottom of the kiln permits the burned lime to cool at the bottom, thus preheating the incoming air which is brought to the firing zone through the burned lime. The cooling of the lime before being drawn from the kiln and the pre-heating of the air are desirable features. Another feature is the continued uniformity of the burning temperature.

At the Curtin plant, but one operator is stationed at the producer. As the operation is practically automatic—as well as the burning of the lime—part of his time is spent on other duties.

From another point of view, as is well known, the capacity of a lime plant with kilns adapted to producer-gas burning can be increased to at least twice its former rating. Installations in the Knoxville district are known to produce as high as 24 tons per day as against 8 to 10 tons per day while being fired with coal. An average daily production in excess of 20 tons is obtained per kiln from the Curtin company plant. In the consumption of coal, four pounds of lime are produced to one pound of coal.

As the Curtin plant is in a district without available power at the time the plant was built, the principal mechanical units are driven by steam engines. A 15-hp. engine operates the producer, and other engines operate the hoist and blower. A 125-hp. boiler supplies the steam.

Probably the principal market for the lime produced in this region is in the chemical industries, a large part of the Curtin Lime Co. output being consumed by tanneries, soap factories, paper mills, and other industries requiring calcium oxide in their processes.

A. S. T. M. Committee C-7 on Lime Reports Current Progress

Committee C-7 on Lime of the American Society for Testing Materials, at its meeting held in conjunction with the group meeting of A. S. T. M. committees of Pittsburgh last month gave consideration to revisions of the specifications for hydrated lime for structural purposes, particularly in respect to the plasticity test. The committee also considered modifications of the present specifications for sand for lime plaster.

The committee has in mind undertaking research work on various phases of lime, one of the first to be undertaken covering the effect of rate of burning on the properties of lime. Of special importance is work now being undertaken in respect to finishing lime, looking toward the development of specifications for this product. Consideration is also being given to the behavior of lime plaster in fire test.

Prepares Tentative Specifications for Cast Stone

A tentative specification for cast stone has been prepared by the federal-specifications board of the U. S. Bureau of Standards, based on the results of tests made by the Bureau.

The specifications require a minimum compressive strength of 4,000 lb. per sq. in. The absorption of water after a 48-hr. test shall be less than 10 per cent, by weight. After the 5-hr. boiling test the absorption of water shall be less than 12 per cent, by weight.

Should the Big Associations Merge?

Additional Letters from Exhibitors Show Trend Is Decidedly in Favor of Proposal

New Association Member Amplifies Ideas on Plan

To the Editor:

Referring to our letter published in your issue of March 11, concerning exhibit of the crushed-stone association, we believe the merging of this association with the sand-and-gravel convention and exhibit would be desirable. We became members of the crushed-stone association quite recently with the purpose of contacting more closely with its members, with many of whom we have had the pleasure of doing business in the past. A more correct and complete expression of our opinion about the exhibit than that contained in our previous letter would be that we appreciate the opportunity which this meeting affords for personal contact and for presenting new equipment for the industry which this association represents. Another year, with more time at our disposal to prepare for the exhibit, we are in hopes of making a better presentation than was possible this year.

SULLIVAN MACHINERY CO.
Chicago, Ill. S. B. King, *Adv. Mgr.*

Adds Voice to Clamor for Merging Gatherings

To the Editor:

As manufacturers of equipment which is sold to sand-and-gravel, rock, cement, and slag producers, we are naturally in sympathy with your idea of merging the big associations. Like yourself, we noticed the advantages of the combined efforts of the rock-and-gravel people in St. Louis, and sincerely hope that you meet with success in your efforts to bring about the merger of these various associations.

CLINTON MOTORS CORP.
Reading, Pa. George M. Bunn, *Sales Mgr.*

Claims Larger Exhibits Would Follow Adoption

To the Editor:

It is my feeling that a consolidation, as referred to in the editorial in the February 11 issue of PIT AND QUARRY, would be very desirable from the manufacturers' viewpoint. This opinion is voiced naturally from a more or less selfish viewpoint with regard to the expense involved, but, at the same time, I am quite certain that it would tend for better exhibits throughout, if the expense item were confined to one show. As a matter of fact, the space item is one of the small items in connection with these exhibits. At the same time, there is a tendency toward using single-booth space as a matter of helping to reduce the cost of both exhibits. Were they consolidated into one show I rather have the feeling that you would see a great many of the manufacturers increasing their space and developing better exhibits.

Cleveland, O. L. B. McK.

Endorses Movement for Benefit of All Involved

To the Editor:

We certainly wish heartily to endorse the movement for the merging of the two associations; certainly, at least, by holding the conventions at the same time and in the same city. We know that this would increase the equipment manufacturers' attendance, as it would materially reduce their exhibition costs. In some instances, under the present arrangement, where the manufacturer does not have a large field in one or the other of the two industries, he does not exhibit at both shows. Under the merger plan it would be possible for him to exhibit at both without adding to his present exhibition costs. We very much appreciate your efforts along this line.

EAGLE IRON WORKS,
Des Moines, Ia. C. B. Laird, *Sales Mgr.*

Cites Other Examples Which Indicate Trend

To the Editor:

We believe that, by all means, the various national associations which hold annual shows should try to combine these shows as much as possible. For example, during the sand-and-gravel show that was held in St. Louis several weeks ago the National Association of Ready Mixed Concrete Producers held their meeting which worked out to the benefit of all, we believe. In Milwaukee, the American Concrete Institute held its annual convention and with it was combined the convention of the Wisconsin Concrete Products Association and the Wisconsin Engineers' Association. It made it possible for all who attended to cover three conventions at the cost of one and we believe that it is in keeping with economies that are interesting to American business today.

BUTLER BIN CO.
Waukesha, Wis. A. R. Morton.

St. Louis Manufacturer Sends Favorable Letter

To the Editor:

From our viewpoint, which probably is a selfish one, we would like to see a merging of the big associations brought about. . . . We did not exhibit at the January crushed-stone show and also withdrew from National Crushed Stone Association membership. This was due, however, to a policy of retrenchment and is only temporary.

St. Louis, Mo. R. F. S.

Kennedy Voices Reason for Advocating Merger

To the Editor:

The writer has advocated the holding of the convention of the road builders, crushed-stone and sand-and-gravel people, all at the same time, and at a given point. This would enable a concrete program to be followed, an exchange of thought, and helpful recommendations in each of the organizations, when combined. This for the reason that they are all fundamentally tied together whether they like it or not. The road builders and the producers of crushed stone and sand and gravel should be friendly competitors, as should be the machinery manufacturers also; there being much in common between them all. A combined convention such as this would make it possible for the manufacturers of machinery in which they are interested to put on a bigger and better exhibit, as they would feel that their efforts would bring their equipment before the entire industry, instead of about one-third of it. We believe that your thought of combining the three organizations' exhibits in one convention will meet with nearly universal approval from the road builders, sand-and-gravel and stone people. In our opnion, there is no excuse for more than one convention, and we most heartily endorse this idea, and tender our thanks for the efforts you are exerting in that direction.

KENNEDY-VAN SAUN MFG. & ENG. CORP.
New York, N. Y. J. E. Kennedy, *Pres.*

Calls Extra Expense to Exhibitors Unreasonable

To the Editor:

We can see no reason why a few petty differences should make it necessary to separate shows which cost the manufacturers who have exhibits almost double expense. We can see no reason why there are not other equipment shows that can be combined in addition to the two big ones. We are very much in favor of your suggestion, although we have no particular exhibit at these conventions, yet we think that, at a combined show, there would be a better display of equipment than there now is at either.

BAY CITY FDRY. & MACH. CO.
Bay City, Mich. H. D. Royal.

Victor Plaster, Inc. Modernizes System for Ventilating Gypsum Mine

Fan at Bottom of Shaft Draws Air Into Workings Instead of Forcing From Above

A NEW industry has developed during the past two years with the opening of the gypsum mine of Victor Plaster, Inc., at Victor, N. Y., and the marketing of its product, which began in March, 1929. A brief description of the plant appeared in PIT AND QUARRY, Apr. 10, 1929. This company specializes in crushed gypsum rock for use as retarder in Portland cement.

The construction of this plant, which is characterized by the simplicity of its operation (practically one-man control) and by its facilities and adaptability for enlargements and improvements, was complete in December, 1928, and started operating early in 1929.

Mining was started north and south of the shaft at 110 ft. in January, 1929. Up to September 30, 1930, the tonnage had more than doubled the entire 1929 shipments. The shaft has four compartments, two cage compartments, a ventilator compartment, and a stairway compartment. Originally the ventilating fan was situated at the head of the shaft, following the general practice of most mines in this vicinity. However, during the past summer, this installation was moved to the foot of the shaft, drawing the air instead of forcing it from above. The temperature of the mine is around 55 deg. The 5-ft.-square air compartment brings the air from the surface and an opening at the foot of the shaft allows it to reach the fan. The large air duct allows the air to move slowly through its 120 ft. of length so that it is cooled to nearly underground temperature by the time it reaches the fan. In this way, there is practically no contraction as would be found if air entered the fan at the outside temperature. Locating the fan at this point also eliminates part of the friction and leakage which would be encountered otherwise and saves the installation of larger equipment for some time.

The room-and-pillar system is employed, pillars 15 ft. by 30 ft. being left for support at intervals of 26 ft. in one direction and 18 ft. in the other. The gypsum bed at this level runs 6½ ft. in thickness and dips about 2 per cent. A feature of this mine is its roof of limestone with a thin layer of black dolomite in a wave-like formation. This roof continues throughout the workings and is conducive to economical operation, as very little propping is necessary. Pumping is a simple item, the water being handled from the bottom by a 7½-hp. pump.

Drilling is done by six Scranton electrically-driven rotary auger drills. Three of these were purchased this year. An Ingersoll-Rand air compressor furnishes air for the Jackhamer drilling, very little of which is required. A blacksmith shop on the premises takes care of all drill sharpening, a Weldit Acetylene Co. outfit being used to stellite the drills. Blasting is done with Dupont Gypsum Special dynamite, Clover fuse and No. 6 caps.

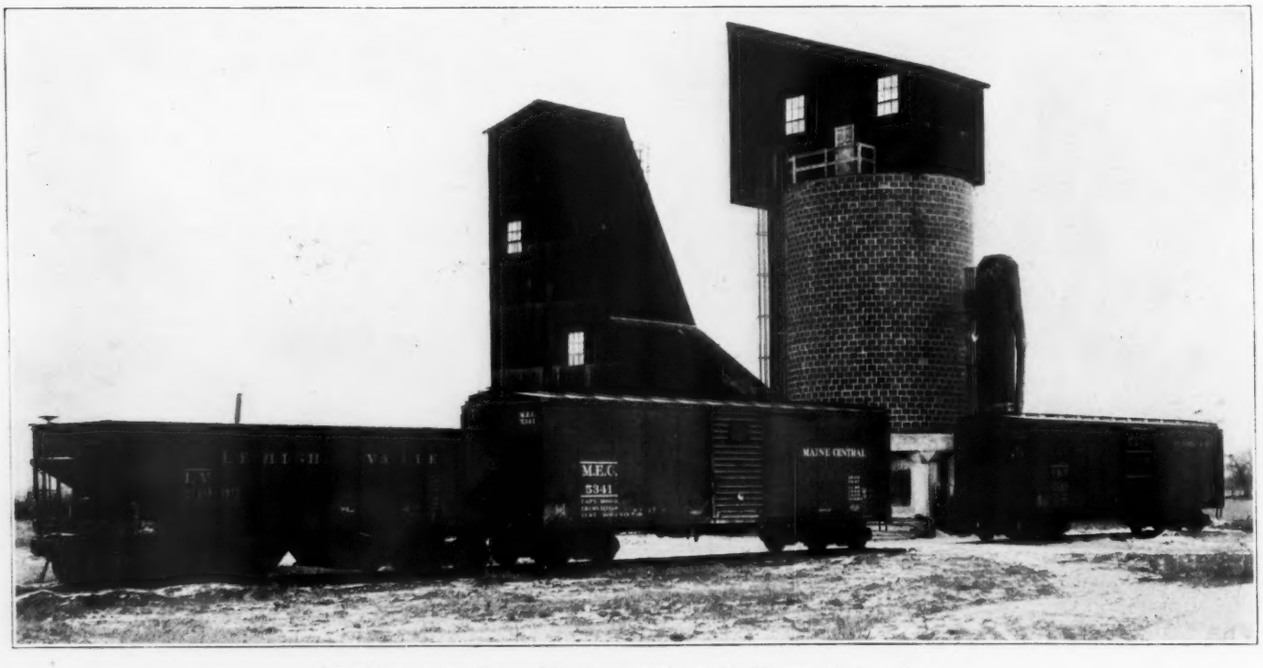
Loading gypsum rock into one of the 2-ton-capacity steel mine cars.

Miner with car of rock at shaft station in the mine. Pump at left.

The rock is loaded into steel cars of 36-cu. ft. or about 2-tons capacity each. The older cars were furnished by the Ricker Mfg. Co., but the last ten cars were made by the Koppel Industrial Car & Equipment Co. A storage-battery locomotive of Goodman make, which was purchased in May of this year, to speed production, hauls the cars to the self-dumping cages. These are hoisted by a Bartlett & Snow 50-hp. engine which has a Cutler-Hammer semi-automatic control. The rock is dumped automatically into a weigh hopper from which it is delivered by a 36-in. apron conveyor to a Pennsylvania 24-in. by 40-in. single-roll crusher, having a capacity of 60 tons per hour.

From the crusher the rock is elevated to a 4-ft. by 12-ft. rotary screen above the silo, and is screened to 1½-in. and under. Oversize pieces are returned by a belt to the crusher.

From the silo the rock runs through a chute to a Schaffer 30-in. Poidometer which automatically weighs and delivers into a loading elevator with 14-in. by 7-in. chain buckets near the track. This elevator raises the rock 30 ft. so it can be readily handled by a 10-in. flexible loading chute into gondola cars. An Ottumwa car loader is used for loading boxcars. The cages, screen, apron conveyors, loading elevator and chute were furnished by the C. O. Bartlett & Snow Co., Cleveland, O.

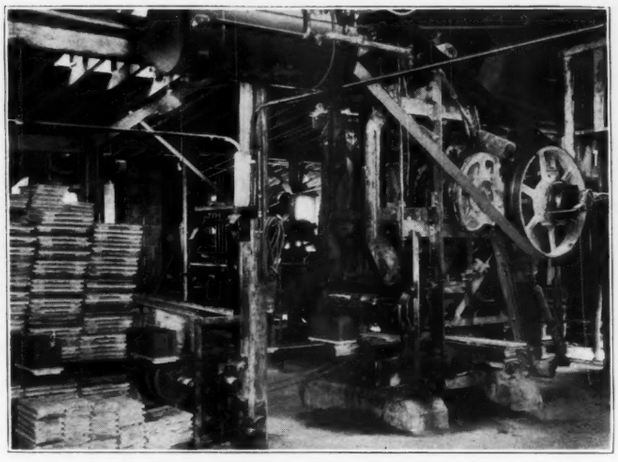


Tipple, storage silo and loading track at the Victor plaster plant.

During the past summer, the old Byers steam hoist which was used at the time of excavating the shaft was electrified. The water in this vicinity is very hard, and it was therefore decided to motorize the hoist. A sufficient cable length is used so that the hoist may be utilized within 300 ft. of the shaft. The company is now planning new construction for the purpose of calcining plaster and manufacturing stucco, blocks, and gypsum lath.

Concrete-Products Plant Adds New High-Efficiency Equipment

THE necessities of the commercial situation last year attending general business conditions forced the Concrete Block & Products Co., Detroit, Mich., to reduce production costs in order to meet competition. This company has been manufacturing concrete blocks, slabs, tiles and bricks for the past seven years, and has established a reputation for its prompt service and the quality of its products. No salesmen are employed, the marketing



Standard stripper which delivers blocks by automatic pusher bars.

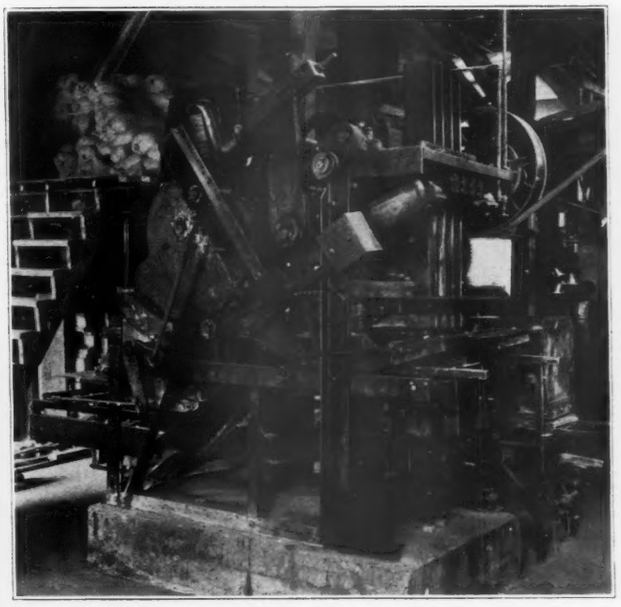
of goods resulting from a close relationship with regular customers and from various kinds of advertising, such as display signs placed upon delivered lots of materials at construction jobs. Desk blotters are sent regularly to interested persons, novelties such as thermometers, cigar lighters, pencils and scratch pads serve as silent salesmen, while football, baseball and basketball teams keep the company's name in prominence locally.

The equipment previously used here for making blocks was a ten-year-old face-down machine, furnished by the Besser Mfg. Co., Alpena, Mich., and some special hand molds for precast bases of electrical refrigerators, chimney blocks and other special forms. The face-down machine has been retained for short runs of special sizes and for face blocks, but new equipment was installed, a few months ago, to speed up production and to reduce labor and material costs.

Regular production of blocks is with a Besser standard stripper equipped for automatic block delivery. The machine can make six blocks, twelve slabs or tiles, or thirty-six bricks per minute. The tiles are made two at a time, 4-in. by 8-in. by 12-in. slabs are made four at a time, while six bricks are made simultaneously, in this new machinery, on a single plain pallet.

The automatic off-bearing system delivers the molded units a distance of 90 ft. without being touched by human hands, although the units may be removed at any point desired for stacking in the curing shed.

The use of a single-size plain pallet conserves



Old-style face-down block machine used in the plant.

labor and storage space, a feature especially desirable in this plant that has insufficient space to store all the pallets that would be required if a special size were used for every size of unit made. The one-size pallet avoids the employment of an additional laborer who would otherwise be necessary to handle pallets. The manufacturer of the new machine claims also that the saving in pallet cost was more than the price of the machine.

With the new equipment, this small plant has a capacity of one million 8-in. by 8-in. by 16-in. units per year. The property has an area of only 107 ft. by 130 ft. The production is even and can be speeded considerably to meet necessities. Only one-half as many men are employed as formerly, notwithstanding the greatly increased capacity of the plant. A. E. Gowdich is manager while his partner, Joe Sattler, handles the office and selling duties.

View of the office, plant and yard.

Study Value of Clay as Admixture in Making Concrete

An investigation of the value of clay as an admixture in concrete has been under way for some months at the U. S. Bureau of Standards.

Comparisons are being made at several ages between the compressive strength, absorption, resistance to freezing and thawing, and permeability to water under pressure, of a mixture of concrete without an admixture, another in which clay to the amount of 10 per cent of the volume of the cement replaced that amount of cement, and a third in which clay was added to the amount of 7½ per cent of the volume of the sand.

Three different brands of cement and three different clays were employed in the tests. Both the cements and the clays were selected to cover a wide range in their plastic properties.

The results thus far obtained have not shown a marked difference between the compressive strengths of the concrete without an admixture and that in which clay had replaced 10 per cent of the volume of cement. The use of clay to the amount of 7½ per cent of the volume of sand has resulted in a small, but consistent, increase in strength, according to the investigation.

State Cement Plants

(Continued from page 56)

ated to put the plant at Rapid City in operation.

According to the profit-and-loss statement issued by the South Dakota State Cement Commission, for the period ending June 30, 1930, the plant has earned $668,684.40 since January 1, 1925. Obviously the discrepancy between this claim of substantial profit and my figures deduced from the same official statement showing a loss of $411,977.89 must be accounted for by different methods of bookkeeping and by failure to make depreciation allowances and other charges approved by modern accounting practice and which are recognized as important factors in appraising the success or failure of any carefully regulated industrial enterprise.

The accompanying table contains a complete schedule of earnings, by years, from January 1, 1925, to June 30, 1930, with proper deductions made for losses not contained in the balance sheets or the profit-and-loss statements. These deductions include interest on bonds, insufficient depreciation and loss of taxes—all of which items are fundamental in determining the financial and economic status of a going concern—whether its ownership be private or public. In addition to the loss shown in the table of $229,577.89 the state has lost the interest on bonds from date of issue to beginning of 1925, the first year of operation, of $182,400.00, making a total loss to the state of $411,977.89.

By some curious bookkeeping a profit of $90,560.07 was claimed for the first six months of 1930, when a glance at the above table will show an actual loss of $1,879.38 when the accepted practices of industrial accounting are followed.

The financial record of the South Dakota plant stamps as questionable, at least, the business acumen and foresight of the commission first appointed to explore the possibilities of a state-owned plant. Included in the findings of this commission was the following prophetic utterance:

"That, with the prospective demand and use of cement in South Dakota within the next five years, we are of the opinion that a cement plant located at Rapid City would save the people of the state twice the cost of building the plant."

SOUTH DAKOTA STATE CEMENT PLANT—STATEMENT OF LOSSES NOT CONTAINED IN BALANCE SHEET OR SEMI-ANNUAL PROFIT-AND-LOSS STATEMENTS

Year	Profits shown by State	Insufficient depreciation[1]	Interest on bonds	Taxes	Loss to State
1925	$ 78,046.55	$ 5,390.50	$102,700.00	$40,500.00	[2] $59,762.95
1926	107,888.63	6,075.26	102,700.00	40,538.24	29,274.35
1927	63,163.70	25,351.59	102,700.00	39,280.07	104,167.96
1928	142,077.65	33,304.66	102,700.00	38,937.71	32,864.72
1929	186,947.60	49,771.79	102,700.00	36,104.34	1,628.53
1930 to June 30	90,560.07	24,141.49	51,350.00	16,947.96	1,879.38
Total	$668,684.20	$121,103.77	$564,850.00	$212,308.32	$229,577.89

[1]Calculated on basis of 5 per cent annually against depreciated fixed assets. This method of calculating depreciation has been approved for the cement industry by the U. S. Treasury Department.
[2]Estimated.

It would be the part of charity, perhaps, to dwell no longer on the evaporation of this prophecy and to let the prophets explain how the vision of a $2,000,000 profit transformed itself into the reality of a $411,000 loss.

In addition to these losses there are other items of expense to be considered which are not entered in the official report of the South Dakota Cement Commission, notably the salaries of state employees whose chief duty is concerned with the production of cement but whose names are carried on other pay rolls.

If a further example of the difficulty in successfully administering a publicly-owned cement plant is necessary, I might point to the experience of Los Angeles, which, in 1909, began operation of a municipal plant to provide cement for an aqueduct. After some years of operation this plant, which cost $890,000, was sold for $450,000 and, in the meantime, it is estimated that the city paid $1.31 per barrel more than the price at which it could have purchased cement from private manufacturers.

I wish to emphasize the fact that the cement manufactured at the South Dakota plant is sold at the market price except in unusual cases. It is sold, moreover, not only in South Dakota but its sale is pressed in adjoining States. This latter imposition involves a phase of government encroachment which has dangerous ramifications and which has been violently condemned by sound economists, but it is beyond the scope of my discussion to-day.

I do not desire to intrude myself into the increasingly bitter controversy over public versus private ownership, but, in all good faith, I would advise state governments that, if they elect to intrude themselves into private enterprises, they avoid the cement business, which stands to-day with an idle capacity of 100,000,000 barrels.

MEN OF THE INDUSTRY

The portrait printed on this page in each number of PIT AND QUARRY is selected without significance as to current events or the position of the individual in the industry.

© Blank-Stoller, Inc.

W. A. DAVIS
Vice-President in Charge of Sales
Standard Portland Cement Co.
Cleveland, O.

Coming Events

April 14, 1930. Albany, N. Y. Regional safety conference of Portland-cement plants in Portland Cement Assn. group. Hotel Ten Eyck.

April 17, 1930. Pittsburgh, Pa. Regional safety conference of Portland-cement plants in Portland Cement Assn. group. William Penn Hotel.

April 13-18, 1931. Cleveland, O. National Industrial Equipment Exposition, in connection with Congress on management, maintenance and materials-handling of A. S. M. E. G. E. Pfisterer, managing director, 308 W. Washington St., Chicago, Ill.

May 4, 1931. New York, N. Y. Thirteenth exposition of Chemical Industries, Grand Central Palace. International Exposition Co., managers, Grand Central Palace, New York.

June 3-4, 1931, White Sulphur Springs, W. Va. Thirteenth annual convention, National Lime Assn., Greenbrier Hotel. Norman G. Hough, president and general manager, 927 15th St., N. W., Washington, D. C.

June 8-12, 1931. White Sulphur Springs, W. Va. Annual convention National Fertilizer Assn., New Greenbriar Hotel. Charles J. Brand, executive secretary and treasurer, 616 Investment Bldg., Washington, D. C.

June 22-26, 1931, Chicago, Ill. Thirty-fourth annual meeting, American Society for Testing Materials. Stevens Hotel. R. E. Hess, asst. secy., 1315 Spruce St., Philadelphia, Pa.

Pumpings from the Old Pit

Excerpts from the old files of PIT AND QUARRY *reveal many interesting sidelights on the activities of the pits, quarries and plants of former days. These are printed in this column each issue.*

Fourteen Years Ago

ORGANIZED for the purpose of crushing and pulverizing limestone for agricultural use, the White Cliffs Lime Co., of White Cliffs, Ark., was incorporated at Little Rock with a capitalization of $100,000.

* * *

The Natomas Co., Oroville, Cal., producer of crushed rock, went on a full-time operating basis following the receipt of an order from the Western Pacific Railway for ballast stone. Forty carloads of material per day was the production schedule.

* * *

Plans for collective purchasing of equipment was the principal topic of discussion at the annual meeting of the Wisconsin Crushed Stone Assn. at Milwaukee. Fifteen producing companies were represented at the gathering. Officers elected were: A. J. Blair, president, Lake Shore Stone Co., Milwaukee; J. J. Sloan, vice-president, Wisconsin Granite Co., Chicago; R. W. Scherer, secretary, Trap Rock Co. of Minneapolis; and Leathem D. Smith, Leathem D. Smith Towing & Wrecking Co., Sturgeon Bay, Wis.

* * *

Ten Years Ago

ANNOUNCEMENT was made of the merger of the Henry Steers Sand & Gravel Co., 17 Battery Place, New York, N. Y. with its affiliated companies, the new organization to be known as Henry Steers, Inc.

* * *

Ben Stone, for many years secretary of the Illinois Concrete Aggregate Assn., resigned that position, effective April 1, 1921, to take over the management of the Merom Sand & Gravel Co., of Merom, Ind., with general offices at Indianapolis.

* * *

Establishment of a state-owned cement plant, to cost approximately one million dollars, was proposed by Senator J. H. Inman, in the California state legislature.

* * *

Kentucky producers along the Ohio River were enjoying exceptionally good business and all plants were working full shifts to supply the demand. Established prices, f. o. b., were $1.00 per cubic yard for sand, $0.90 for gravel up to ½ in. and $1.15 for ½ to 1-in. gravel.

* * *

Five Years Ago

DEWEY PORTLAND CEMENT CO. announced that plans were in progress for the erection of a wet-process cement plant to be located three miles west of Davenport, Ia. A site of 220 acres on the banks of the Mississippi River had been acquired. The J. C. Buckbee Co. of Chicago was in charge of the design.

* * *

New Corporations included the following: Buffalo Gravel Corp., Buffalo, N. Y.; Huntington Gravel & Supply Co., Houston, Tex.; Crescent Sand & Gravel Co., Yakima, Wash.; Hoosier Sand & Gravel Co., Terre Haute, Ind.; Consolidated Cement Corp., Wilmington, Del.; Interstate Sand & Gravel Corp., Wilmington, Del.; Northwestern Portland Cement Co., Seattle, Wash.

* * *

A new crawler loader, known as the "Grizzly" was announced by Link-Belt Co., Chicago.

* * *

Work was started on the new 1,500,000 bbl. plant of the Florida Portland Cement Co., at Tampa, Fla., under the supervision of the Cowham Engineering Co., of Chicago, designer.

* * *

The plants of the Granite Sand & Gravel Co. of Indianapolis, Ind., were described in a staff article. The plants included the three operated by the company in the Indianapolis metropolitan area and a fourth at Morristown, Ind. All employed the conventional washing and screening processes and excavation at each operation was by means of a Sauerman slack-line cableway.

New Corporations

WESTERN WISCONSIN GRAVEL CO., La Crosse, Wis. $60,000. A J. Rasmussen, 1127 Main St.; E. G. Bigham, both La Crosse; L. A. Kennada, Holmen, Wis.

MANITOWOC SAND & GRAVEL CO., Manitowoc, Wis. $5,000. Irving, Charles & Amy Fricke. To crush, excavate, haul and deliver sand, gravel and stone.

SELLERSBURG CRUSHED STONE CO., INC., Sellerburg, Ind. 200 shs. n.p.v. William J. Ehringer, Lionel Dold, Clifford Allhands and Ernest Davis. To operate stone quarry.

VIRGINIA ROCK PRODUCTS CO., INC., Charlottesville, Va. $50,000. A. W. Higgins, president, Alexandria, Va. To quarry limestone.

WELCH-SANDLER SAND CO., Kansas City, Mo. $50,000. Casimer J. Welch, 717 E. 15th St.

WALLACE FLUORSPAR CO., Sturgis, Ky. $15,000. W. D. Wallace, I. D. Winston, C. W. Pugh, W. S. Williams and J. W. Ruby.

LIBERTY GRAVEL CO., INC., Gloster, Miss. S. A. Gano, Jackson; A. S. Mading, Pine Bluff, Ark.

SPY RUN SAND & GRAVEL CORP., Fort Wayne, Ind. 500 shs. n.p.v. Levi H. McAfee, Wm. C. Hagerman, Theodore Hagerman and Otto Buechner.

BUILDERS SAND CORP., Davenport, Iowa. $20,000.

BRAEN SAND & GRAVEL CO., Hawthorne, N. J. $200,000.

COTTON BELT SAND & GRAVEL CO., Jonesboro, Ark. $20,000. H. L. Dickinson, Benton, Ark., and others.

NEWARK SAND & GRAVEL CO., Newark, Ark. $20,000. H. L. Dickinson, Benton, Ark., and others.

HEARNE SAND & GRAVEL CO., INC., Charlottesville, Va. $50,000. Lyman W. Perkins, Alex W. Spencer and others.

Personal Mention

G. M. Butler, dean of the College of Engineering and Mining, University of Arizona, spent a short time in Chicago recently while en route home to Tucson from a recent business trip to eastern cities. Mr. Butler is also state geologist and director of Arizona's Bureau of Mines.

Col. C. F. von dem Bussche, treasurer and general manager of the Wellston Iron Furnace Co., which operates a Portland cement plant at Superior, O., was united in marriage, March 11, to Mrs. Jean Kennedy of Detroit, Mich.

Joseph F. Heil has been elected a director and vice-president of the Heil Co., Milwaukee, manufacturers of welded-steel motor-truck bodies, hydraulic hoists and tanks. He is the son of **Julius P. Heil,** founder and president, and is also treasurer, Milwaukee Air Power Pump Co. and Combustion Oil Burner Co., divisions of the Heil Co. **Bert W. Fueger** has been elected vice-president of these divisions, and **Herman W. Falk,** president, Falk Corp., is a new member of the boards.

John May, who has been manager of sales of the electrical and wire-rope department of the New York office of the American Steel & Wire Co., has been appointed assistant general manager of sales under **D. A. Merriman,** vice-president and general manager of sales. Mr. May has assumed charge of a new sales office which was established on April 1 at the North works, Worcester, Mass., to cover sales of wire specialties in New England. **F. Kenneth Sawyer,** of the Worcester office, and **Hugo D. Sharp,** of the Boston office, are his assistants. Mr. May was graduated in electrical engineering from the University of Maine in 1905 and four years later joined the sales department of the American Steel & Wire Co.

Otto W. Lutz has been elected president of the Sand, Gravel and Stone Co-Operative Association of Wisconsin, recently organized in Milwaukee. The other officers are **Louis A. Garrity,** vice-president; **A. A. Retzlaff.** secretary, and **Henry Jaeger,** treasurer.

Bruno Kaestner, H. C. Luebke, P. W. Palmer, Arthur Devos and **W. Hartung,** with the officers, form the board of directors.

F. C. Thompson, vice-president and general manager of the Morse Chain Co., Detroit and Ithaca, N. Y., subsidiary of the Borg-Warner Corp., announces the following appointments: **Frank M. Hawley,** sales manager and chief engineer of the automotive and marine divisions; **C. B. Mitchell,** production manager of the Detroit plant.

Charles W. Krueger, Rock Island, Ill., has sold a tract of land containing sand and gravel deposits, to the Rock Island Sand & Gravel Co. The land adjoins the present pit and plant of the Rock Island Sand & Gravel Co., which has been in operation several years.

Albert C. Lehman, president of Blaw-Knox Co., has sailed for Europe aboard the French liner *France* on a ten weeks' business and pleasure trip abroad. While abroad he will attend conferences with the heads of the various subsidiary companies of Blaw-Knox in England, France, Germany and Italy, with the expectation of increasing the company's plant capacity

E. H. Cooper, since 1927 manager of the Barber-Greene Co. of Kansas City, has been appointed ditcher line head for the western division to operate with **J. M. Bruns,** ditcher line head for the Eastern Division. Mr. Cooper has been with the Barber-Greene Co. since 1925. The territory formerly served by Mr. Cooper as manager of the Kansas City office of Barber-Greene Co. is now divided between the Kenney Machinery Co. of 2301 Grand Avenue, Kansas City, Mo., and the Buda Engine Service of 521 West Archer St., Tulsa, Okla. Two new branch managers are also announced by the Barber-Greene Co. They are **Frank Ness,** manager of the Barber-Greene Co. of Philadelphia, and **D. H. McLean,** manager of the Barber-Greene Co. of Cleveland. He had been with the Barber-Greene Co., at its Boston office, for five years. Mr. McLean was graduated from the University of Colorado in 1924 and after coaching football for two years joined the Barber-Greene Co., entering the Detroit branch office after several months experience at the home plant at Aurora, Ill.

John H. Kelly has joined the staff of the Thermoid Rubber Co. of Trenton, N. J., manufacturers of mechanical rubber goods. Mr. Kelly started with the B. F. Goodrich Co. in 1898 and from there went to the Republic Rubber Co., where he rose to vice-president in charge of sales by 1912. Later he became president of the Hewitt Rubber Co. and when this organization entered the Gutta Percha Rubber Mfg. Co.-Robins Conveying Belt Co. merger, he assumed the vice-presidency in charge of sales. Since 1928, when Mr. Kelly was forced to retire from active duty due to a serious illness, he has been doing special counselling work.

M. E. Coulter, branch manager of the Henry Cowell Lime & Cement Co., in Sacramento, Cal., has been elected president of the Aviation Club of Sacramento.

George Newhard of Allentown, Pa., formerly employed in the mill of the Superior, O. cement plant of the Wellston Iron Furnace Co., has been placed in charge of the company's new recreation hall.

Herman A. Olson, for many years a plaster salesman in Minneapolis, Minn., and was recently with the Certainteed Products Co., has accepted the position of Twin Cities salesman for the National Gypsum Co.

Thomas P. Burke has been appointed district manager in charge of the Jeffrey Manufacturing Co.'s recently-opened factory-branch office located at 602 Esperson Building, Houston, Tex.

Manley E. Culhan, president of the Interstate Equipment Sales Corp., Cleveland, O., has arranged for his company to represent the Mid-West Locomotive Works in northern Ohio. He was formerly sales manager for the McMyler-Interstate Co. His company is the district representative also for the Manitowoc Engineering Co. and the Ohio Locomotive Crane Co.

Obituary

Chas. Sanford Knight, Jr., sales manager of electrical and wire rope of the American Steel & Wire Co., Chicago, died March 11. He was born in Worcester, Mass., June 15, 1864. At the age of 14 years he was employed by the Washburn-Moen Mfg. Co. in Worcester, as a weigher and timekeeper. From that position in early youth he was advanced, from time to time, until he became sales manager.

He was well known in the electrical, power and industrial world and was a member of numerous clubs and associations, including the Chicago Athletic Assn., Union League Club, Lake Shore Athletic Club, South Park Masonic Lodge, Oriental Consistory and Medinah Shrine. He is survived by his widow, Mary Earle Knight; a son Earle, who was a lieutenant in the World War; a sister married to David Star Jordan, chancellor emeritus of Stanford University; and a sister, Mrs. Landis, who was mayor of Seattle.

Alfred Bishton Botfield, an originator of high-temperature cement and organizer of the Botfield Furnace Specialties Co., Philadelphia, now Botfield Refractories Co., died in Miami recently aged 83 years. He retired from active business in 1915.

Walter L. Smith, 62, president of the Memphis Stone & Gravel Co., Memphis, Tenn., died March 23, after an illness of several months.

Traffic News and Comment

Recent I. C. C. Decisions

Cement

The commission has decided that the rates on cement from Chanute, Humboldt, Fredonia, Iola, Independence and Mildred, Kan., and from Dewey, Okla., all of which are in the so-called Kansas Gas Belt, to destinations in Colorado on and east of the so-called Colorado common-point line extending from the Wyoming border south through Greeley, Denver, Colorado Springs, Pueblo and Trinidad, including Canon City and Golden, Colo., and stations intermediate thereto, and to points in southeastern Wyoming on the U. P. east of and including Laramie, and on the C. B. & Q. east of and including Cheyenne, are not unjust or unreasonable, but that they are unduly prejudicial to complainants and unduly preferential of shippers at Portland, Concrete, Boettcher and Laramie, Wyo. Very low rates were in effect from the Colorado-Wyoming producing points, one example being the rate to Denver from Portland which was 8 cents, whereas for the distance of 142 miles the scale 4 rate was 16 cents. Plants located at great distances from markets are often given favorable rates to allow them to compete in the market, but this was a case of nearby plants being given the concession which was defended on the ground that it was necessary on account of the difficult operating conditions of these plants. The report states that the commission did not have sufficient information to enable it to pass on this question in this individual case, and that it was not its duty to pass on such questions but rather to adjust rates fairly to transportation conditions.

While the operators of the Wyoming mill took the position that it was economically unsound for shippers in Kansas to ship several hundred miles into a comparatively small market when nearby mills could supply this market the commission held that it was not its duty to decide what selling policy was economically sound for these mills, but that it was its duty to see that the freight rates were fairly adjusted. Undue prejudice and preference may be removed by the publication of rates based on an average of scales 3 and 4. This would make the rates from Portland, Boettcher and Laramie to Denver, 14½c, 11½c, and 15c respectively. The carload min. wt. was placed at 50,000 lb., and permission was given to publish the same rate from Laramie to Denver as would apply from Portland to Denver. I. C. C. Docket No. 22,020, Iola Cement Mills Traffic Assn. et al., v. A. T. & S. F., et al.

Ground Limestone

Reasonable rates on ground limestone, c. l. min. wt. 60,000 lb., from Barber, Va., to various points have been prescribed by the commission through the use of two mileage scales, and reparation has been awarded on the damage suffered by reason of the rates which were found unreasonable. Rates in effect to points in Ohio, Indiana and Illinois were found not unreasonable. The first scale, which is reproduced below under column 1-S, covers shipments via interstate routes to points in southern classification territory on and north of that part of the line of the S. A. L. extending from Jacksonville to River Junction, Fla., for movement over a single line. The second scale shown under column 1-J, is for joint line movement to points in the same territory. To these scales, arbitraries are to be added, when shipments move over certain short or weak lines, which are to accrue to the benefit of these lines. The scales under columns 2-S and 2-J are for single-line and joint hauls respectively, to points in eastern trunk-line territory in West Virginia, Virginia, the District of Columbia, Maryland, Delaware, Pennsylvania, New Jersey and New York, the application to points in Virginia to apply only to interstate routes. In applying these scales, distances are to be computed via the shortest routes over which carload traffic can be moved without transfer of lading, and carriers under common management or control are to be considered as one line. Reasonable rates are to be made effective not later than May 20. I. C. C. Docket No. 22,771, Falling Spring Lime Co., Inc., v. C. & O., et al., and Sub. 1, Same v. Pennsylvania et al.

Miles	1-S	1-J	2-S	2-J
20	$0.80	$0.90	$0.65	$0.75
30	0.90	1.00	0.75	0.85
40	1.00	1.10	0.85	0.95
50	1.10	1.20	0.95	1.05
60	1.20	1.30	1.05	1.15
70	....	....	1.15	1.25
80	1.30	1.40	1.20	1.30
90	....	....	1.25	1.35
100	1.40	1.50	1.30	1.35
120	1.50	1.60	1.40	1.40
140	1.65	1.70	1.45	1.45
160	....	....	1.50	1.50
170	1.80	1.80	....	....
180	....	....	1.55	1.55
200	1.90	1.90	1.60	1.60
220	....	....	1.65	1.65
230	2.00	2.00	....	....
240	....	....	1.70	1.70
260	2.10	2.10	1.75	1.75
280	....	....	1.80	1.80
290	2.20	2.20	....	....
300	....	....	1.85	1.85
320	2.30	2.30	1.90	1.90
340	....	....	1.95	1.95
350	2.40	2.40	....	....
360	....	....	2.00	2.00
380	2.50	2.50	2.05	2.05
400	....	....	2.10	2.10
410	2.60	2.60	....	....
420	....	....	2.15	2.15
440	2.70	2.70	2.20	2.20
460	....	....	2.25	2.25
470	2.80	2.80	....	....
480	....	....	2.30	2.30
500	2.90	2.90	2.35	2.35
540	3.00	3.00	....	....
580	$3.10	$3.10	....	....
620	3.20	3.20	....	....
660	3.30	3.30	....	....
700	3.40	3.40	....	....
740	3.50	3.50	....	....

Moulding Sand

The rate of $2.68 a net ton, applicable on moulding sand from Hardy, Ind., to Knoxville, Tenn., has been found not unreasonable, but the rate on the same commodity from Sandale, Ind., to Knoxville, Tenn., was, is and, for the future, will be unreasonable to the extent it exceeded, exceeds or may exceed $2.68. Reasonable rate is to be made effective not later than June 4. Reparation was awarded. This complaint involved the application of the Sligo rule which was upheld by the commission. I. C. C. Docket No. 23,421, Fulton Sylphon Co. v. C. N. O. & T. P., et al.

Examiners' Reports

Moulding Sand

Examiner Garofalo proposes that the commission find the rates on moulding sand from Elnora, Mechanicville, Schenectady and Ushers, N. Y., to Chattanooga, Tenn., unreasonable to the extent they exceeded $5.40 a net ton, and award reparation. He contends that the rate of $5.40 which was applicable from Aqueduct, Saratoga Springs and Schuylerville, N. Y., to Chattanooga, Tenn., was not unreasonable. I. C. C. Docket No. 23,416, Crane Enamelware Co. v. B. & O., et al.

Sand and Gravel

A new basis for rates on sand and gravel and other commodities taking same rates, between points in Missouri, between points in Kansas, between points in Missouri and Kansas, and between points in Missouri and Kansas on the one hand, and Oklahoma and Arkansas on the other, has been proposed by Examiner E. H. Waters. Single-line and joint-haul rates at various intervals of the scale are:

Miles	Single	Joint
10	$0.50	$0.65
100	1.00	1.15
200	1.50	1.60
320	1.90	2.00
410	2.20	2.25
500	2.50	2.50
620	2.90	2.90
710	3.20	3.20
800	4.50	4.50

It is suggested that the distance be computed over lines and via junctions that can be used in the interchange of freight without transfer of lading, and that the min. wt. should be 90 per cent of the marked capacity of the car. While the findings are only intended to cover interstate traffic, the case was heard with the various state commissions. It is expected that state commissions will be guided in the matter of state rates by the decision of the Federal Commission. The above basic

scale of rates was also suggested for silica or glass sand in open-top cars between points in Arkansas, Oklahoma, Texas and western Louisiana, and between points in Missouri, between points in Kansas, between points in Missouri and Kansas on the one hand, and Oklahoma and Arkansas on the other. Rates on silica or glass sand in box-cars between the points named are to be made on a scale shown in the proposed report. A few of these rates are:

Miles	Rate	Miles	Rate
10	$0.64	620	$3.24
100	1.30	710	3.48
200	1.83	800	3.72
320	2.30	900	3.95
410	2.63	1,000	4.15
500	2.92		

Maximum rates for various local services are also covered in the report. The case was opened at the suggestion of the Missouri commission as a part of the Hoch-Smith investigation on sand, gravel and crushed stone as No. 17,000, part 11-A, the main part of No. 17,000, part 11 having been decided previously and published in 155 I. C. C. 247.

New Complaints Filed

Sand

It is alleged that the rates on sand from Polk, Pa., to Erie, Pa., via interstate routes are unreasonable and reparation is sought as well as reasonable rates for the future in I. C. C. Docket No. 24,291, National-Erie Co., Erie, Pa., v. N. Y. C.

Rate-Committee Dockets

NEW ENGLAND ASSN.

Limestone

To meet motor-truck competition, carriers propose to reduce the rate on limestone, c. l. min. wt. 50,000 lb., from North Pownal, Vt., to Johnsonville, Valley Falls and Schaghticoke, N. Y., to 5 cents. The present rate is 6 cents on a c. l. min. wt. of 40,000 lb. Docket No. 22,131.

TRUNK LINE ASSN.

Crushed Stone

The carriers propose to reduce the rate on crushed stone, c. l., min. wt.,[1] from Oriskany Falls, N. Y., to French Road Siding, New Hartford, N. Y., from 60 cents to 40 cents per net ton, to meet motor-truck competition. Docket No. 26,287.

Shippers are asking for a reduction in the rate on crushed stone, c. l., min. wt.,[1] from Port Richmond (Philadelphia), Pa., to Tuckahoe, N. J., from $1.15 to 85 cents per net ton, to meet motor-truck competition. Docket No. 26,311.

Crushed Stone, Coated

A mileage scale as a basis for rates on crushed stone, coated with tar, oil or asphaltum, c. l., min. wt.,[1] from Casparis, Pa., to stations on the B. & O. west of Harpers Ferry, W. Va., in the states of West Virginia, Maryland, Pennsylvania and Virginia, also to points south of Harpers Ferry, W. Va., to and including Strasburg, Va., is proposed by shippers. The rates range from 96c for 10 miles and under to $3.03 per net ton for a distance of 400 miles and more than 370. Docket No. 26,317.

Ground Limestone

A reduction in the rate on ground or pulverized limestone, c. l. min. wt. 50,000 lb., is asked by shippers at Grove, Frederick, Keller, Buckeystown, Md., Engle and Martinsburg, W. Va., on shipments to Bridgeton, N. J., from 14½c per 100 lb. to 13c. The proposed rate is fairly comparable with the rate from Thomasville, Pa.

Lime

Rates which are fairly comparable with rates from C. F. A. 60-per cent points are proposed on lime, c. l. min. wt. 40,000 lb., from Bellefonte and Pleasant Gap, Pa., as follows: to Caribou, Papleton and Presque Isle, Me., 44c., and Van Buren, Me., 45c. per 100 lb. Docket No. 26,313.

Sand

To meet motor-truck competition the carriers propose to reduce the rate on sand, c. l. min. wt. 90 per cent of marked capacity of car, from South Lakewood and Farmingdale, N. J., to Plainfield, N. J., from 80c. per net ton to 70c. Docket No. 26,192.

Shippers are asking for a reduction in the rate on common sand, c. l. min. wt.,[1] from Palermo, N. J., to Tuckahoe, N. J., from 69c. per net ton to $20 per car, to meet motor-truck competition. Docket No. 26,307.

Sand and Gravel

To meet motor-truck competition, shippers at Junius and Oak Corners, N. Y., are asking that the rate on sand (common or building) and gravel, c. l. min. wt.,[1] to Dox, N. Y., be reduced from 75c. per net ton to 70c. Docket No. 26,221.

CENTRAL FREIGHT ASSN.

Crushed Stone

Through commodity rates are proposed on crushed stone, screenings, and agricultural limestone, in bulk in open-top cars, c. l., min. wt.,[1] from Sandusky and Marblehead, Ohio, to stations in Michigan, to replace the sixth class which is effective to most destinations. A few of the proposed rates in Docket No. 27,874, to Michigan points, are:

To	
Adrian	$1.10
Albion	1.25
Ann Arbor	1.15
Bad Axe	1.75
Bay City	1.45
Blackman	1.40
Cassopolis	1.55
Charlotte	1.35
Detroit	0.95
Dundee	1.10
Flint	1.35
Grand Haven	1.85
Grand Rapids	1.55
Hartford	1.85
Hillsdale	1.15
Jackson	1.17
Kalamazoo	1.45
Owosso	1.35
Sturgis	1.35
Tecumseh	1.02
Ypsilanti	1.13

Shippers at Sandusky, O., are proposing that the rate on crushed stone, screenings and agricultural timestone, in open-top cars, c. l., min. wt.,[1] to La Carne and Oak Harbor, O., be reduced from 60c. to 50c. per net ton. Docket No. 27,880.

A rate of 60c. per net ton is proposed by shippers on crushed stone, c. l., min. wt.,[1] from Ransoms, O., to Toledo, O. The present rate is 70c. Docket No. 27,905.

Lime

The carriers propose to establish alternate rates on lime from Milltown, Ind., to Wisconsin Dam, Wis. The proposed rate on a min. wt. of 60,000 lb. is 24c. and on a min. wt. of 30,000 lb. is 25½c. Class rates now govern. Docket No. 27,897.

Sand and Gravel

Shippers at Moravia, Pa., are asking for the establishment of rates on sand (except blast, core, engine, fire, furnace, glass, grinding, foundry, grinding, polishing, loam, moulding or silica) and gravel, c. l. min. wt.,[1] in straight or mixed cars, in open-top equipment, to destinations in Maryland, Pennsylvania, Ohio and West Virginia, on the basis of the scale shown below. Rates shown are per net ton for single-line haul, 20c. to be added for joint hauls. Docket No. 27,823.

Miles	Rate	Miles	Rate
20	$0.60	125	$1.10
40	0.70	150	1.20
60	0.80	175	1.30
80	0.90	200	1.40
100	1.00		

SOUTHERN FREIGHT ASSN.

Ground Limestone

Shippers propose the establishment of rates of ground limestone for agricultural purposes, in open-top cars, between all points on the L. & N. in the state of Tennessee, for intrastate movements only, on the same basis that applies on crushed stone. Docket No. 54,266.

WESTERN TRUNK LINE

Crushed Stone

At present there is no standard basis for making rates on crushed stone from Illinois producing points to destinations in Iowa, nor is there a standard minimum weight. Shippers are proposing that rates be established on the basis of I. C. C. 21,755 sand-and-gravel single-line scale, subject as minima to the Iowa interstate single-line rate, c. l. min. wt. to be the marked capacity of the car. Docket No. 6,952-A.

Lime

Through rates on lime, c. l. min. wt. 30,000 lb. from Mosher, Ste. Genevieve and Glen Park, Mo., to replace the present combination rates and various minimum weights are proposed in docket No. 403-J as follows: to Ashland, Wis., 23½c., to Tomahawk, Wis., 26c., and to Ontonagon, Wis., 27½c. per 100 lb.

(Continued on page 84)

Financial News

The information contained in these financial pages is given with the understanding that any statement on the part of this magazine or any of its staff, as to the responsibility or standing of any person, firm or corporation, or as to the value of any property or securities is a mere expression of opinion, given as a matter of service to the readers of PIT AND QUARRY, *for which no responsibility in any way is to attach to this magazine or to any of its staff.*

Consumers Co. Declares Dividend on Preferred

Consumers Co. of Chicago, which, in addition to a large general building-materials business, is an important producer of sand, gravel and crushed-stone, has declared the regular quarterly dividend of $1.50 on prior preference stock, payable April 1 to stock of record March 25.

Contract for the management of the company by the Peabody Coal Co., which was effected in August, 1924, was terminated.

A. C. O'Laughlin, formerly vice-president, was named president; Joseph Hock and J. J. O'Laughlin were elected vice-presidents and the other retiring officers were reëlected.

North American Cement Earnings Drop Slightly

The report of North American Cement Corp. for the year ended December 31, 1930, shows net profit of $263,092, after interest, depreciation, depletion and federal taxes, equivalent to $5.09 a share (par $100) on 51,500 shares of 7 per cent preferred stock, on which there is an accumulation of unpaid dividends. This compares with $282,294, or $5.48 a share in 1929.

Income account for year 1930 compares as follows:

	1930	1929
Net sales	$4,584,574	$4,863,582
Costs and exp.	3,149,674	3,430,508
Balance	$1,434,900	$1,433,074
Other income	23,575	26,745
Total income	$1,458,475	$1,459,819
Depr. and depl.	723,253	662,513
Interest and amortizations	449,772	491,643
Federal taxes	22,358	23,369
Net profit	$ 263,092	$ 282,294
Pfd. dividends	88,443	90,125
Surplus	$ 174,649	$ 192,169

The company's balance sheet as of December 31, 1930, compares as follows:

ASSETS

	1930	1929
*Property and plant	$12,926,779	$13,453,098
Cash	735,354	778,979
Accounts receivable	364,468	258,047
Inventories	792,586	1,015,089
Investments	7,250	62,798
Treas. securities	298,700	.....
Sinking fund	584	584
Prepaid exp.	608,031	661,168
Total	$15,733,752	$16,229,763

LIABILITIES

	1930	1929
Pfd. stock	$ 5,150,000	$ 5,150,000
†Common stock	1,412,500	1,412,500
Bonds	6,880,500	7,135,500
Accounts payable	56,428	302,824
Ac., wg., int., etc.	181,269	200,466
Plant additions	.....	54,000
Federal tax res.	38,935	32,369
Reserves	62,636	66,183
Int. and earn. surp.	1,951,484	1,875,921
Total	$15,733,752	$16,229,763

*After depreciation and depletion.
†Represented by 133,250 no-par shares.

Material Service Corp. Reports Lower Profits

Material Service Corp. of Chicago consolidated net profit for 1930 was $264,040 after all charges, including depreciation, depletion, interest and federal taxes, equal to $2.11 a share on 125,000 shares of $10 par capital stock. This compares with $417,994 or $3.34 a share in 1929. Sales in 1930 were $7,571,465 compared with $9,202,813 in 1929.

Medusa Portland Cement Reduces Dividend Rate

The Medusa Portland Cement Co., of Cleveland, O., has declared a quarterly dividend of 75 cents on the common stock, placing the stock on a $3 annual basis, against $6 previously. The regular quarterly dividend of $1.50 on the preferred stock also was declared. Both dividends are payable April 1.

Arundel Corp. Business in 1931 Shows Increase

Arundel Corp., sand-and-gravel-producers on a large scale at Baltimore, Md., reports February net income of $131,140 after depreciation and taxes, comparing with $130,121 in February, 1930. For the two months ended February 28, net income totaled $269,900 against $262,020 in the first two months of the previous year.

Current assets as of February 28, 1931, amounted to $4,570,984 and current liabilities, $1,195,644.

Pennsylvania Salt Cuts Common Dividend to $3

The Pennsylvania Salt Manufacturing Co. has declared a quarterly dividend of 75 cents, placing the stock on a $3 annual basis, against $5 which had been paid previously. The 75-cent dividend is payable April 15.

International Cement Is Accumulated by Traders

Wall Street interests who are classed in the group of long-pull speculative investors have been giving considerable attention to International Cement Corp. stock, listed on the New York Exchange. For 1930, the company reported net income of $4,527,744, or $7.12 a share, compared with $7.88 in the preceding 12 months. That was termed satisfactory, considering business conditions. At recent selling levels, the stock has been yielding between 6½ and 6¾ per cent, which has been responsible for quiet buying in the stock by traders who insist the issue is out of line with many others that were unable to make as good a showing for 1930, according to the *Wall Street Journal*.

CURRENT DIVIDENDS

Company	Class of Stock	Dividend Rate	Holders of Record	Payable
Alpha Portland Cement	Preferred	$1.75 qr.	Mar. 2	Mar. 14
Alpha Portland Cement	Common	$0.25 qr.	Apr. 1	Apr. 25
American Aggregates Corp.	Preferred	$1.75 qr.	Mar. 20	Apr. 1
Arundel Corp.	Common	$0.75 qr.	Mar. 23	Apr. 1
Boston Sand & Gravel	Preferred	$0.87½ qr.	Mar. 21	Apr. 1
Boston Sand & Gravel	Common	$0.30 qr.	Mar. 21	Apr. 1
Calaveras Cement Co.	Preferred	$1.75 qr.	Mar. 31	Apr. 15
Canada Cement Co.	Preferred	$1.62½ qr.	Feb. 28	Mar. 31
Consolidated Oka Sand & Gravel	Preferred	$1.75 qr.	Mar. 24	Apr. 1
Consumers Co.	Preferred	$1.50 qr.	Mar. 25	Apr. 1
Coronet Phosphate	Common	$1.50 qr.	Mar. 25	Apr. 1
Dolese & Shepard	Common	$1.00 qr.	Mar. 20	Apr. 1
Duffein Paving & Crushed Stone	Preferred	$1.75 qr.	Mar. 20	Apr. 1
Fitzsimons & Connell	Preferred	$1.75 qr.	Mar. 21	Apr. 1
General Asphalt	Common	$0.75 qr.	Mar. 2	Mar. 16
Gypsum, Lime & Alabastine, Ltd.	Common	$0.20 qr.	Mar. 28	Apr. 1
Ideal Cement Co.	Common	$0.75 qr.	Mar. 14	Mar. 31
International Cement	Common	$1.00 qr.	Mar. 11	Mar. 31
International Salt	Common	$0.75 qr.	Mar. 16	Apr. 1
Johns-Manville	Preferred	$1.75 qr.	Mar. 11	Apr. 1
Johns-Manville	Common	$0.75 qr.	Mar. 25	Apr. 15
Kelley Island Lime & Transport	Common	$0.62½ qr.	Mar. 20	Apr. 1
Lawrence Portland Cement	Common	$1.00 qr.	Mar. 16	Mar. 31
Lehigh Portland Cement	Preferred	$1.75 qr.	Mar. 14	Apr. 1
Lehigh Portland Cement	Common	$0.25 qr.	Apr. 14	May 1
Medusa Portland Cement	Preferred	$1.50 qr.	Mar. 25	Apr. 1
Medusa Portland Cement	Common	$0.75 qr.	Mar. 25	Apr. 1
National Gypsum	Preferred	$1.00 qr.	Mar. 20	Apr. 1
Newayo Portland Cement	Preferred	$1.75 qr.	Mar. 25	Apr. 1
New York Trap Rock	Preferred	$1.75 qr.	Mar. 20	Apr. 1
Owens-Illinois Glass	Preferred	$1.50 qr.	Mar. 16	Apr. 1
Pennsylvania Salt	Common	$0.75 qr.	Mar. 31	Apr. 15
Pittsburgh Plate Glass	Common	$0.50 qr.	Mar. 10	Apr. 1
Santa Cruz Portland Cement	Common	$1.00 qr.	Mar. 21	Apr. 1
Superior Portland Cement	Class B	$0.25 qr.	Mar. 14	Mar. 20
Texas Gulf Sulphur	Common	$1.00 qr.	Mar. 2	Mar. 16
U. S. Gypsum Co.	Preferred	$1.75 qr.	Mar. 14	Mar. 31
U. S. Gypsum Co.	Common	$0.40 qr.	Mar. 14	Mar. 31
Wallace Sandstone	Preferred	$1.50 S.A.	Mar. 30	Apr. 15
Warner Company	Common	$0.50 qr.	Mar. 31	Apr. 15
Warner Company	1st Pfd.	$1.75 qr.	Mar. 14	Apr. 1
Warner Company	2nd Pfd.	$1.75 qr.	Mar. 14	Apr. 1

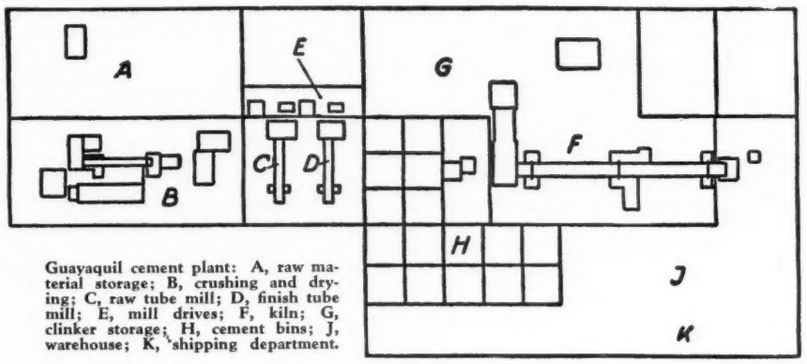
Review of Foreign Practice

Cement Mill in Ecuador Is Small but Efficient

Construction of a cement plant was decided on several years ago at Guayaquil, capital of Ecuador, to utilize deposits of limestone and clay with chemical compositions that seemed to be appropriate to the manufacture of a good cement. The contract for the construction of the plant was awarded to the Krupp Gruson works of Germany and, among other conditions imposed on the builder, was provision for an installation capable of producing economically the low daily quantity of 240 bbl. The plant has individual electric drives throughout, and operates in the conventional manner for a dry-process plant.

An inclined belt conveyor carries the clay to a drier, passing first through a crusher which breaks up the large lumps, and the dried clay is stored in one of the compartments of a large double bin. Limestone arriving from the quarry is discharged directly to a jaw crusher, from which it is fed to a dryer and then stored in the other bin compartment. Two feeders deliver the materials from storage to a raw-grinding tube mill, installed beside the finish-grinding mill which is identical (in fact, they are interchangeable), with it; both mills are driven from motors in a dust-proof room adjoining the grinding room.

The product of the mill is mixed in a large five-compartment bin to insure homogeneity, and reclaimed by a screw-conveyor and bucket-elevator system to a rotary kiln 2 meters in diameter and 30 meters long. The kiln is fired with crude petroleum, and the elimination of the usual coal drying and crushing system, etc., is one of the reasons why it was possible to develop an economical plant with such low capacity. Clinker passes through a cooler under the kiln, and is conveyed to a large storage room from which it is later reclaimed directly to the finish grinding mill. Screw conveyors and a bucket elevator carry the cement to a cement bin with a capacity of 3,000 tons, under which are the sacking and barreling equipment.—*Revue des Materiaux de Construction* No. 255, pp. 492-3, Dec. 1930.



Guayaquil cement plant: A, raw material storage; B, crushing and drying; C, raw tube mill; D, finish tube mill; E, mill drives; F, kiln; G, clinker storage; H, cement bins; J, warehouse; K, shipping department.

Strength Properties of Quick-Hardening Cement

Reviewing the significance of the "hochwertig" or high-test cements on the market in Germany, the author of this article points out that there is an erroneous idea that these cements are quick-setting, while actually they are normal in set, but harden rapidly to high-early-strength. In practice it is not possible to take full advantage of these higher strengths in diminishing the proportions and weight of the concrete structures, because of other conditions that affect the handling of the concrete. The greatest advantages of the high-early-strengths are economic; they make it possible to remove forms considerably earlier, thereby effecting a great savings in the amount of formwork required for speeding up the construction work greatly. The prices current in Germany are about 25 per cent higher for these high-test cements than for the ordinary cements, and the economic advantages must therefore be balanced against the higher cost of material. In general, the use of the super cements is advisable in structure requiring forms, while for massive concrete works the ordinary cements are quite as satisfactory.

To this discussion the author adds a report on the results of his investigations to compare the strength properties of the high-test cements at considerably longer periods than those at which comparisons are usually made. These tests show that the strength of the high-test cements goes on increasing to two years, as compared with three to six months for the ordinary cements. These tests also showed that because of the latent hydraulic properties of blast-furnace slag, the strengths of the high-test slag cements lag behind those of high-test Portland at early periods, but in later periods overtakes and surpasses them.—P. May in *Tonindustrie-Zeitung* 55:171-173, Feb. 9, 1931.

Requirements of Spain's Cement Plants Described

At the recent Congress of Industrial Chemistry in Barcelona, Patricio Palomar, manager of the Asland cement factories of Catalonia, presented a report on the importance of the cement industry in Spain and its relation to other industries of the country. All of the materials used in cement manufacture are of Spanish origin, and the rock quarried annually amounts to more than 2,500,000 tons and will before long reach 3,500,000 tons. Although a little of the coal used comes from England the main part of it is from Spanish mines. The annual coal consumption of Spanish cement plants is 500,000 tons, which is 15 per cent of the total Spanish coal production, and includes coal used both for cement-burning and for power production. Many plants of course purchase electric power from hydroelectric companies or generate their own hydroelectric power. The total annual consumption is estimated at 180,000,000 kw. In Catalonia the greatest user of the electric power generated at the great hydro plants in the Pyrenees is the cement industry. Also there are recently three plants (the Villaluenga, Pobla and Bilbao factories of the Asland company) which produce their power from waste gases.

The industry requires about 7,000,000 bags annually to renew 20 to 25 per cent of the bags in circulation; the principal material is jute, which of course is imported, although manufactured in Spain. Recently an improved bag has been developed which is 15 per cent smaller although holding the same quantity (50 kg.) of cement, which it is estimated will save about a million pesetas a year. The machinery used in cement manufacture is all of foreign manufacture, but annual replacements and repairs to the value of 2,000,000 pesetas are manufactured in Spain. Lubricants are of foreign origin but mostly refined in Spain. The refractories for kiln linings are made in that country, as are also the explosives.

Although most of the Spanish plants were built by foreign engineers, there is now a large and important group of industrial and chemical engineers in the country who can furnish the technical guidance for management and research. The industry employs, in general, 1½ workmen per ton of cement produced daily, or about 7,500 workers, and the total given employment, including warehouses, salesmen, etc., must be around 10,000.—*Cemento* (Barcelona) 2:581-3, Nov. 1930.

Recent Patents

AMERICAN

Cement

Portland cement. Andrew Lundteigen, Kansas City, Mo., and Guy O. Gardner, Chanute, Kan., assignors to Ash Grove Lime & Portland Cement Co., Kansas City, Mo., No. 1,794,526.

Cement and Concrete

Concrete mixing and distributing apparatus. James E. Bushnell, North Plainfield, and Robert C. Lukachovic, Dunellen, N. J., assignors to Ransome Concrete Machinery Co., Plainfield, N. J. No. 1,796,282.

Crushing

Crushing roll. Alexander G. McGregor, London, England. No. 1,795,663.

Crushing apparatus. Edgar B. Symons, Los Angeles, Cal., assignor to Nordberg Mfg. Co., Milwaukee, Wis. No. 1,796,413.

Pulverizer. Clarence R. Taylor, Chicago, Ill., assignor to Grindle Fuel Equipment Co., Harvey, Ill. No. 1,796,545.

Hammer-type mill and feeder. Albert L. Veeder, Boise, Idaho, assignor to V. & L. Mill & Feeder Corp., same place. No. 1,797,107.

Excavating

Excavating and tunneling apparatus. William R. Degenhardt, London, and Alfred F. de Fraine, Wembley, England, assignors to Francois Cementation Co., Ltd., Doncaster, England. No. 1,795,108.

Drag-line bucket. Arthur B. Sittig, Chicago, Ill., assignor to American Manganese Steel Co., Chicago Heights, Ill. No. 1,795,803.

One-piece bucket and attaching link. Irving Warner, New Castle, Del., assignor to American Manganese Steel Co., Chicago Heights, Ill. No. 1,795,982.

Positive-crowd mechanism (excavating machine). Asger Eilersgaard, Chicago, Ill., assignor to Link-Belt Co., same place. No. 1,796,285.

Grab-bucket. Willem Voorwinde, Rotterdam, Netherlands. No. 1,796,351.

Dipper-tooth. Lesher W. Van Buskirk, Easton, Pa. No. 1,796,737.

Excavating machine. John W. Emerick and William E. Emerick, Halfway, Mich. No. 1,796,889.

Excavating or boring apparatus. William R. Degenhardt, London, Allen F. de Fraine, Wembley, and Robert H. Bicknell, Westminster, assignors to Francois Cementation Co., Ltd., Doncaster, England. No. 1,797,024.

Lime

Reaction determination and control especially for the production of hydrate from quicklime. Clarence R. Rex, Toledo, O. No. 1,796,396.

Lime-slaking machine. Edwin J. Shaut, Tujunga, Cal., assignor to Baker Lime Machinery Co. No. 1,796,411.

Mining

Mining machine. Charles E. Davis, Chicago, Ill., assignor to Goodman Mfg. Co., same place. No. 1,794,367.

Mining-machine bit and bit-holder. Edwin P. Stenger and John R. Cartlidge, Cincinnati, O., and Frank Cartlidge, Chicago, Ill., assignors to Cincinnati Mine Machinery Co., Cincinnati. No. 1,795,804.

Miscellaneous

Mechanical loader particularly for use in mines. Austin Y. Hoy, London, England, assignor to Sullivan Machinery Co., Claremont, N. H. No. 1,796,459.

Material-storage plant. David E. White, La Grange, Ill., assignor to Roberts & Schaefer Co., Chicago, Ill. No. 1,796,549.

Sand drier and screen device. Thomas W. Steele, Dorton, Ky. No. 1,796,911.

FOREIGN

Cement

Cement with high silica content, burned below sintering temperature. Joachin Hempel. German 519,529.

Rotary heat exchanger for solid materials, especially for the handling of cement and ore. Moeller & Pfeifer. German 520,841.

Crushing and Grinding

Hammer mill with divided grate. Fried. Krupp Grusonwerk Akt.-Ges. German 519,527.

Dustproofing device for the bearing of the inner cone of cone crushers. Nordberg Manufacturing Co. German 520,573.

Gyratory crusher. Traylor Engineering & Manufacturing Co. German 520,574.

Spring roller mill, from which the material is removed by means of an air current. Ernst Curt Loesche. German 520,838.

Device for the reduction of hard materials, in which the free fall of grinding elements and charge is utilized for the grinding action. Curt von Grueber Maschinenbau Akt.-Ges. German 520,577.

PIT AND QUARRY *will furnish, at its actual cost, a copy of any patent cited here. A charge of ten cents per copy is made by the U. S. Patent Office, Washington, D. C., and readers may procure a copy directly by addressing the Commissioner of Patents, with payment for copies requested. Postage stamps are not accepted by the Patent Office. We will endeavor to obtain copies of foreign patents for our readers but we cannot give assurance in every case for the reason that copies of such patents are not printed for distribution as liberally as are the American copies, nor is there a fixed charge per copy.*

Drilling

Drill. Alfred Francis Powell. German 520,616.

Drill valve. Bernard Hendry Scott. German 520,617.

Drying

Closure for rotary drier. Bamag-Meguin Akt.-Ges. German 519,979.

Drier. Willy Geils. German 519,509.

Rotary drier. Deutsche Babcock & Wilcox Dampfkessel Werke Akt.-Ges. German 519,980.

Process for drying wet materials by means of hot gases. Dr. Ing. Paul Rosin. German 520,842.

Gypsum

Chemical printing on plaster boards. United States Gypsum (Harry E. Brookby). Canadian 309,332.

Kilns

Shaft furnace for treating solid materials with gases. Aktieselskapet Norsk Staal (Elektrisk-Gas-Reduktion). Canadian 308,660.

Tunnel kiln. Carborundum Co. Canadian 309,252.

Tunnel kiln. Rudolf Schneider. German 519,610.

Rotary kiln for the production of fused cement. Arno Andreas. German 519,797.

Shaft kiln for thermic and chemical treatment of pulverulent and granular masses. Reginald Vandezee Farnham. German 519,978.

Material-Handling

Method of making spiral conveyor flights. Joseph Dennis Christian. Canadian 309,391.

Roller for gravity carriers. Mathews Conveyor Co. (Charles A. Adams). Canadian 309,528.

Car-dumping device. Firma Armin Tenner. German 519,629.

Conveyor trough with belt conveyor. Hauhinco Maschinenfabrik G. Hausherr, E. Hinselmann & Co. G. m. b. H. German 519,430.

Trough conveyor with belt-conveyor equipment. Hauhinco Maschinenfabrik G. Hausherr, E. Hinselmann & Co. G. m. b. H. German 519,431.

Belt conveyor. Tage Georg Nyborg and Mark Frederick Higgins. German 520,822.

Method of changing the direction of a belt conveyor or belt drive. Austin Hopkinson. German 520,825.

Corner device for belt conveyor. Telefon-Apparat-Fabrik E. Zwietusch & Co. G. m. b. H. German 520,826.

Conveying device. Samson Daniels Wright. German 520,786.

Bridge for removing strippings. Dr. Ernst Voigt and Mitteldeutsche Stahlwerke Akt.-Ges. German 520,610.

Bin closure, particularly for coal bins and the like. Maschinenbau Augsburg-Nuernberg Akt.-Ges. German 520,598.

Mixing

Drum for concrete-mixing machines. Jaeger Machine Co. (Gebhard Jaeger and Joseph Eggert). Canadian 309,286.

Concrete plant. Robert W. Fieroh. Canadian 309,399.

Separating

Process and apparatus for manufacturing wires for sieves. Rudolf Herrmann. Canadian 309,165.

Sieve for fine screening. Rudolf Herrmann. Canadian 309,166.

Process of extracting impurities from mineral raw materials. La Societe des Produits Chimiques Alterra Soc. Anon. (Richard Staufer and Kamillo Konopicky). Canadian 309,548.

Sacking

Bag-sewing machine. United Shoe Machinery Co. of Canada, Ltd. (Arthur Bates and Fred Ricks). Canadian 309,328.

Bag-filling machine. Modern Valve Bag Co. German 519,611.

Sack-closing device. Georg Lechte. German 520,918.

Silica

Method of removing colloidal silica. Gian Alberto Blanc. Canadian 309,145.

Unclassified

Process and apparatus for dehydrating hydrates. Charles Guy Clarke. Canadian 309,148.

Concrete pile foundation. Shojiro Takechi. Canadian 309,197.

Synchronous-motor control. Canadian General Electric Co., Ltd. Canadian 309,224.

Salt Company to Award Contract for Equipment

The Carey Salt Co., of Hutchinson, Kas., is proceeding with development of salt mines at Winnfield, La., and will soon let contracts for buildings and machinery. Allen & Garcia Co., engineers, 332 S. Michigan avenue, Chicago, will have the letting of the contracts.

Premier Granite Obtains Painted Horse Holdings

The Premier Granite Co., of Llano, Tex., has purchased the quarry properties of the Painted Horse Granite Co., located near Llano, and will carry out an expansion program in the near future. New quarrying, hoisting, conveying, loading and other machinery will be installed. Finishing equipment is also being considered.

Carolina Gravel Plant Plans Greater Capacity

The B. V. Hedrick Gravel & Sand Co., which recently rebuilt its gravel-washing plant near Lilesville, N. C., is now planning to increase the daily capacity of the plant from thirty to sixty cars of material per day. The entire system of stock storage is to be reorganized and rearranged, by installing a number of 6-cu. yd. clamshell derricks, to increase the storage capacity. The company has also acquired 600 acres of additional cliffside lands, thus increasing its gravel acreage to more than 1,200 acres. New equipment to be added soon will include a Diesel engine, screens, crane and other machinery.

Proposes 8-Hr. Day for Quarrymen in Michigan

A bill which would establish an eight-hour day in the mining and quarrying industries in Michigan has been introduced in the state legislature at Lansing by Rep. James F. Jewell, of Hubbell. Employers of men working in mines, mills and quarries would pay time and a half for work in excess of eight hours, except in cases of emergency when life and property were in danger, according to the bill. The penalty for violation of the law would be a fine of from $50 to $500, each day's violation being considered a separate offense.

Knoxville Gravel Plant Has New Superintendent

H. S. Covert, formerly of Harriman, Tenn., has succeeded E. L. Osborne as general superintendent of the Knoxville Sand & Lime Co., of Knoxville, Tenn. Mr. Osborne remains as president of the company. Mrs. Milton McDermott is vice-president and R. O. Bryan, secretary-treasurer.

Mr. Covert has had many years experience in the building material industry. He was formerly connected with the Thomas Moulding Brick Co.

Changes at Pittsburgh and Cleveland Offices

The Shepard Niles Crane & Hoist Corp. recently moved its sales offices in Pittsburgh to the Grant Bldg. Roy W. Hurst, who has been connected with the company for years and, until recently, in the New York office, will be in charge as district manager. Frank J. Kinney, who has represented the company for many years in the Pittsburgh territory, will be associated with Mr. Hurst.

Roy W. Hurst.

Harry A. Baugh.

The sales office in Cleveland has been moved to 1433 East 12th St. and Harry A. Baugh will be in charge as district manager. Mr. Baugh was recently in the Chicago office and for many years was district manager of the Pittsburgh office.

Statement of Ownership

PIT AND QUARRY

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of PIT AND QUARRY, published bi-weekly at 538 S. Clark Street, Chicago, Ill., for April 1, 1931.

State of Illinois, County of Cook, ss.

Before me, a notary public in and for the state and county aforesaid, personally appeared H. W. Baumgartner, who, having been duly sworn according to law, deposes and says that he is the publisher of PIT AND QUARRY, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are:

Publisher, Complete Service Publishing Co.; Editor, S. A. Phillips; Managing Editor, A. J. Hoskin; Business Manager, V. E. Larsen, all of Chicago, Ill.

2. That the owner is Complete Service Publishing Co., Chicago, Ill. That the stockholders owning 1% or more of the total amount of stock are: H. W. Baumgartner, I. A. Baumgartner and V. E. Larsen, all of Chicago, Ill.

3. That there are no bondholders, mortgagees, or other security holders owning or holding 1% or more of total amount of bonds, mortgages or other securities.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company, but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

H. W. BAUMGARTNER,
Publisher.

Sworn to and subscribed before me this 20th day of March, 1931.

(Seal.) M. J. STANTON,
Notary Public.

My commission expires Dec. 9, 1934.

Manufacturers' Publications

Each publication listed below contains information of interest to non-metallic mineral producers. Readers may obtain, without charge—except where a price may be stated—and without obligation, copies of any of these publications by writing directly to the manufacturers who publish them. Please mention PIT AND QUARRY *when writing.*

Air Separators

Raymond Mechanical Air Separators for Closed-Circuit Grinding. 4 p., 2 ill. (Raymond Bros. Impact Pulverizer Co., Chicago, Ill.) Describes and illustrates a mechanical air separator for use in grinding raw and finished cement, gypsum, phosphate rock and other materials. Operating records at typical installations are summarized.

Bins

Johnson Batchers and Bins. (The C. S. Johnson Co., Champaign, Ill.) A loose-leaf catalogue which describes and illustrates batching bins for ready-mixed concrete plants, storage bins for aggregates, complete concrete-plant equipment, volume batchers, and weigh batchers.

Boilers

Kips Bay Station of the N. Y. Steam Corp. 12 p., 12 ill. (Combustion Engineering Corp., New York, N. Y.) Describes and illustrates the use of pulverized-coal in the boilers installed at a large central-heating plant in New York, N. Y.

Car-Pullers

The Fridy Line of Car-Pullers and Hoists. 16 p., 19 ill. (Bulletin No. 115, Fridy Hoist & Machinery Co., Mountville, Pa.) Describes and illustrates a line of car-pullers and hoists and lists a large number of concerns in the pit-and-quarry industry where they are in use.

Concrete Mixers

Concrete Mixers Mounted on Autocar Chassis. 16 p. Illustrated. (The Autocar Co., Ardmore, Pa.) Describes and illustrates, with line drawings and photographs, a complete line of truck-mounted concrete mixers. Mixers supplied include Paris, Jaeger, Rex and Highway, all mounted on Autocar chassis.

Crushers

Pennsylvania Steel-Built Penn-Lehigh Crushers. 16 p., 9 ill. (Bulletin 2003. Pennsylvania Crusher Co., Philadelphia, Pa.) Describes and illustrates a series of single-roll primary crushers built for heavy-duty service. Specifications and detail drawings are included.

Crushing Plants, Portable

600 Tons of Rock in 10 Hours. 4 p., 4 ill. (Diamond Iron Works, Inc., Minneapolis, Minn.) Describes and illustrates a portable crushing and screening plant of great capacity, employing jaw- and roll-type crushers and a rotary scalping screen.

Electric Motors

Westinghouse Small-Power Motors. 16 p. Illustrated. (Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.) Describes and illustrates motors of from 1/500 to 2 horsepower for use on various types of drives with low power requirements.

Excavators

The Michigan Shovel. 8 p., 10 ill. (Michigan Power Shovel Co., Benton Harbor, Mich.) Describes and illustrates a gasoline-powered shovel in which the power plant is stationary, the machine permitting full-circle loading, three-quarter digging, and no-tail-swing operation.

Locomotives, Gasoline

Milwaukee Gasoline Locomotives. 32 p., 37 ill. (Publication No. 150. Milwaukee Locomotive Mfg. Co., Milwaukee, Wis.) Describes and illustrates in detail the Type H gasoline locomotive, built in sizes ranging from 4-ton to 25-ton. Condensed specifications included. Publication No. 160 describes the Type J locomotives, in 4- and 4½-ton sizes, built by this company.

Miscellaneous

Products of American Chain Co., Inc., and Associated Companies. 12 p. (American Chain Co., Inc., Bridgeport, Conn.) Describes the various products made by this concern and its associates and carries a complete list of American sales offices for quick reference by buyers.

Pumping Accessories

Murray Acid-Proof Plungers. 4 p., 4 ill. (The Murray Pump & Valve Mfg. Co., New Lexington, O.) Describes and illustrates a pump plunger of wood and non-metallic composition for replacement in plunger pumps.

Scrapers

Ateco Hydraulic Dirtmovers. 12 p. Illustrated. (Bulletin No. 131. American Tractor Equipment Co., Oakland, Cal.) Describes and illustrates a hydraulic dirtmover for use with Caterpillar tractors.

Stokers

C-E Stoker Unit. 4 p., 4 ill. (Combustion Engineering Corp., New York, N. Y.) Describes and illustrates a self-contained underfeed stoker with electric-motor drive and integral-fan construction.

Welding

"The Manufacture of Carbon and Graphite Welding Electrodes." 4 p., 4 ill. (*The Fusion News*, Issue No. 20. Fusion Welding Corp., Chicago, Ill.) Describes and illustrates the care involved in the selection of raw materials and manufacture of carbon and graphite welding electrodes.

"Ductone Fluxed Electrodes." 4 p., 8 ill. (*The Fusion News*, Issue No. 19. Fusion Welding Corp., New York, N. Y.) Describes and illustrates a new fluxing principle for metallic-arc electrodes, with improvements in operating characteristics and weld properties.

Traffic News

(*Continued from page 79*)

SOUTHWESTERN BUREAU

Cement

Shippers are proposing the establishment of a rate of 15½c. per 100 lb. on cement (hydraulic, Portland or natural), c. l. min. wt. 50,000 lb. from La Salle, Ill., to Cape Girardeau and Marquette, Mo. The proposed rate is the same now applicable in the reverse direction. This is a plant-to-plant movement. The operators at Marquette, Mo., intend to greatly increase the production at that point and it will be necessary to ship a large volume of cement from their plant at La Salle, Ill., to the plant at Marquette in connection with the enlarged operations.

Plaster

Application for a rate of 40c. per 100 lb., to apply on export traffic only, on wall plaster, plasterboard, plaster of paris and other items as described in Item 970 of T. C. F. B. Tariff 29-U, c. l. min. wt. 80,000 lb., from Cement, Ideal, Okeene, Southard and Eldorado, Okla., to points of destination in California, Oregon, Washington or British Columbia as named in Item 970 of above tariff, has been made by an interested shipper. Applicant advises that it is negotiating with Australian and New Zealand dealers with whom it contemplates a substantial export business. No specific export rate is today applicable from Oklahoma producing plants of plaster, although the proposed rate is applicable from Kansas, New Mexico and Texas plants, and it is contended the Oklahoma plants should enjoy a rate no higher. Docket No. 22,522.

[1] The proposed carload minimum weight will be 90 per cent of the marked capacity of the car except, when car is loaded to full cubical or visible capacity, actual weight will apply.

Roller-Bearing Concern Moves Chicago Offices

The western sales division of the Hyatt Roller Bearing Co. has moved its headquarters from 111 W. Washington St. to 230 N. Michigan Ave., Chicago, Ill.

Insurance Problems Discussed

Pensions

THE ostrich, which puts its head in the sand and imagines its body is entirely hidden from view, furnishes one of the quaintest moral lessons in the world. Most of us, at some time, try to settle a vexing problem by ignoring it or by denying that any such problem exists.

That is the case of many employers with respect to their old workmen. Pensioners are a distasteful subject. They don't do you any good. You have already got all the work out of them, but you just can't be cold-blooded enough to turn them out on the street. So the average employer goes on trying to avoid the problem of retirement, unwilling to face the plain fact that it is an inevitable feature of industry.

Young Firms Affected

All employers can be assigned to three different classes. First, there are the vigorous young companies, under fifteen years old. Their employees are all young and active; nobody ever thinks about retiring. Secondly, there are many successful, middle-sized concerns which have reached the turning point to a new generation. The faithful workers who built up the good will are now in their fifties and sixties. These deserve a reward and rest. But the owners realize that if they saddle the load of pensions onto the current operating costs, it would make a prohibitive overhead. The middle-aged workers must be "ditched" or the company will tax itself into bankruptcy. Finally, there is a fast-growing third group of companies which recognize that pensions should be planned before they fall due.

For Small Companies

Please do not think that pensions are a problem only to U. S. Steel and the other industrial giants. A very successful pension plan is in force in a little concern that has only eleven employees. Probably the payment of just one pension would cripple that firm seriously. Nor is a young firm exempt. If your company is made up of young men, take warning that they may reach retirement age at approximately the same time, and that right now is when you should guard against that situation.

Economic Laws

The theory of pensions is based on economic laws more than on sentiment. You know that some day you will have some old men in your ranks and you will have to take care of them. If you are paying one hundred dollars a month to a man of seventy-two, he probably does not earn it. The time when he did earn it was when he was thirty or forty. A man is entitled to a pension only because of the profits you made out of his services when he was young. Therefore, the cost of his retirement should be spread over his productive years and not taken out of profits after he quits work.

Private Reserves

There are two ways to take care of pensions. In both cases they require that a reserve should be set aside each year in proportion to an employee's service, so that the retirement funds are already available when needed. One plan is for the employer to set aside a reserve each year equal to a certain percentage of the pay roll. The other plan is to buy pension insurance from one of the large life insurance companies.

Maintaining your own pension reserve is a rather complicated business. First, you must hire a competent actuary to calculate how much reserve you need and to check the reserve periodically. Then the problem of investments is serious. After a few years, your private reserve would contain many thousand dollars, and it would require a lot of time and brains to handle the stocks and bonds in the fund.

Best for Workers

Private pension plans are distinctly unsatisfactory to employees because they are not guaranteed. If anything happens to the firm, the plan is sunk. If the reserve provided is too small, all the pensions must be reduced or abolished. In passing, you should note that most private reserves do fall behind, either through faulty calculations or through investment losses. With a private plan, too, the employer can change his mind at any time and reduce or abolish the pensions according to his whim. But the most frequent risk is that the company itself may fail, the pension fund will be seized to pay the general creditors and the old employees will be left out in the cold.

The most spectacular failure of a private pension plan occurred in Chicago about five years ago. One of the "big five" in a basic industry virtually failed—it became so badly impaired that it had to merge with its largest competitor. Now this company had a very generous pension plan under which scores of old employees were already enjoying a well-earned retirement. The new owners, however, said very curtly, "We have no obligation to the old employees; they never did anything for us." With the collapse of that plan came calamity to hundreds of old men and widows.

Insurance Plan

The insurance plan for pensions is very simple. The benefits and the cost can be made flexible enough to meet any employer's needs. Typically, each employee will pay a monthly premium of three per cent of his wages and the employer will add about two per cent. Then when the employee reaches the retirement age (60, 65 or 70, for example), he will receive a pension of one and one-half per cent of his average earnings for each year of service. That is, suppose a man has worked for thirty years for the same firm at an average income of $200 a month. His pension at 1½ per cent for 30 years will then be: 30 x 1½ per cent = 45 per cent, or $90 a month as long as he lives.

Past Services

One of the snags in settling up an insured pension plan is what credit to allow for past service. When you buy insurance, you have some employees who have already been with you for several years, and it would be unfair to them not to recognize this past service. It is not feasible to make these workers dig into their savings but, by spreading a moderate cost over several years, the employer himself can make up half the credit for past years.

An insurance plan is not upset by any future contingency. Your board of directors can stop future premiums, but the portion of the pension already earned cannot be taken away. If an employee dies, his heirs will get back all he put into it. If he is discharged or quits, he still retains the full pension value of his previous deposits and may even go on paying the future premiums for a pension of his own.

Shovel Manufacturer to Erect Units in Canada

Bay City Shovels, Inc., Bay City, Mich., manufacturers of convertible power shovels, cranes and excavators has completed arrangements with the John Anglis Co., Ltd., of Toronto, to manufacture the various Bay City machines in Toronto.

Orders have been placed with the Inglis company for the construction of a number of shovels. Work will begin immediately on the tractor-shovel model, as soon as materials can be procured. Production of the larger full-revolving models will follow as soon as tractor-shovel production is under way. Full-revolving models ordered for prompt delivery during the time required to get into production may be shipped partly completed from Bay City to the John Inglis Co., Ltd., at Toronto, where final assembly and delivery will be made, but all models are to be manufactured in Canada as soon as possible.

The sale of equipment made in Canada will be continued through the present Canadian distributors of Bay City Shovels, Inc., under the supervision of the home office at Bay City, Mich.

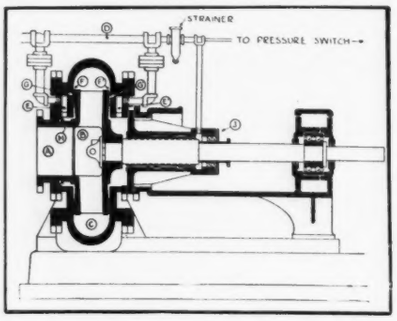
New Machinery and Supplies

Centrifugal Pump Unit Employs Unusual Ideas

The Hydroseal pump, built by the Allen-Sherman-Hoff Co., 225 So. 15th St., Philadelphia, Pa., is said to overcome high maintenance, low average efficiency, and discharge-pressure limitations that are inherent in ordinary dredge pumps. It is not built along conventional lines. The standard of materials and niceties of workmanship employed together with a unique design justify the claims that are made for this pump. In view of its success in pumping ashes, it is felt that the Hydroseal pump has a wide application in pumping sand, gravel, ore, rock, coal sludge or any abrasive-laden liquid.

The operation of the Hydroseal unit is identical with that of a standard centrifugal pump. Attention, however, is called to the following unique features which are shown in the accompanying diagram-section.

Clear water at a pressure that is low relative to the pump-discharge pressure is connected through pipes to the header *D*, this water passing into chambers *E* and *E'* on both sides of the impeller. Due to the adhesion of this water to the side surfaces of the impeller and because of the close clearance at points *F* and *F'*, the initial pressure of the clear water is boosted above the pressure in the main volute *C*. The annular clearances *F* and *F'* are thus continuously filled with clear water flowing into the volute *C*, not with abrasive-material-laden water flowing in the opposite direction. It is evident that the abrasives in the water can not wear the outside of the impeller shrouds or the side plates *G* and *G'*.



Pump section showing method of sealing with fresh water.

Leakage through the sealing ring *H* is low-pressure clear water only, not high-pressure abrasive-laden water. The efficiency of the sealing ring is thus maintained and the pump can retain its initial efficiency and discharge head indefinitely.

The clear water introduced at *E* and *E'* need not be at a pressure higher than the pump-discharge pressure. The gland *J* merely holds the low-pressure clear water in the annular bearing and therefore requires little attention. Abrasive water can not leak along the shaft.

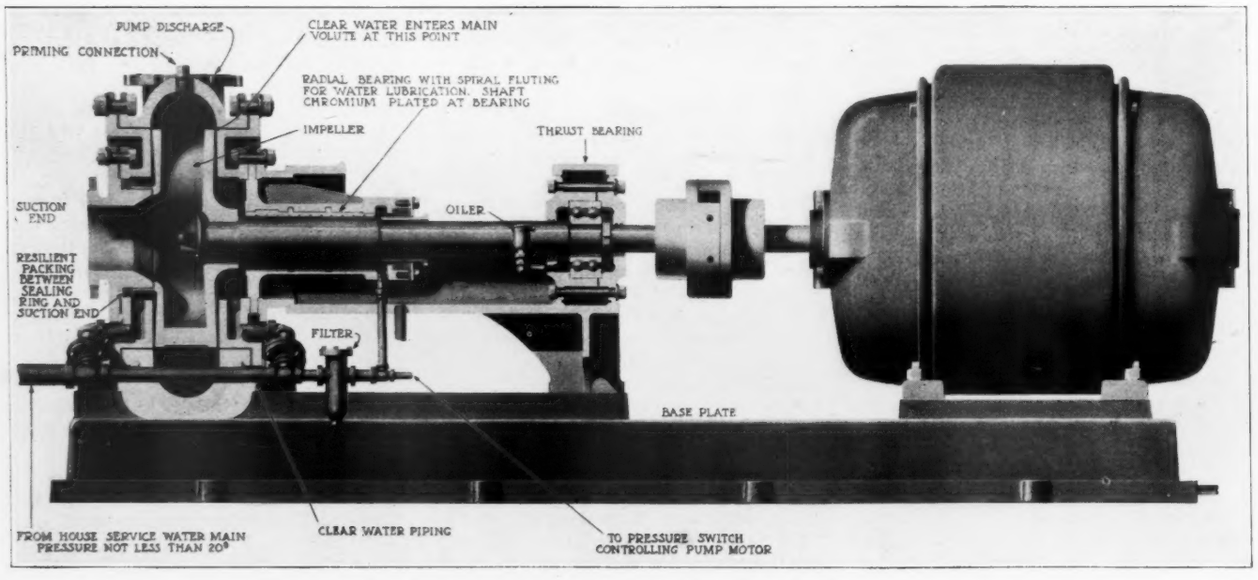
There is almost no "over-hang" of the impeller shaft beyond the bearing, tending to produce shaft whip. Since the bearings are located so that there is almost no shaft overhang, the peripheral speed of the impeller can be unusually high. Because of this, and the fact that leakage at the sealing ring is unaffected by the discharge head of the pump, it is practical to produce pressures as high as 150 lb. per sq. in. and still maintain high efficiencies. Such pressures in a single-stage open a wide field in material handling without the use of pumps in series.

The amount of clear sealing water is minimized and controlled. This is a great advantage where such water is expensive or where it is important to maintain maximum concentration. The clear water controls the electricity or steam supply for its drive. It is thus impossible to start or operate the pump unless clear water is available, although careless operation or failure of water supply can not ruin the pump.

Great care has been taken in the development of an electric alloy-steel casting most resistant to wet abrasion. After exhaustive tests and analysis of field results, a steel alloy of chrome, molybdenum, and nickel known as Ashcolite D was chosen. The shell (casing or volute) is of the solid, non-split type. The walls are made with exceptionally heavy sections of this alloy. The finished portions of the shell are accurately ground to dimension.

The impeller is of the totally-inclosed, overhung type. Ashcolite D is again liberally proportioned for durability and finished surfaces are ground to size. The passages are designed to permit the free flow of material of a maximum size, with a minimum reduction in efficiency. The periphery runs from 0.006 in. to 0.008 in. from the bells, which also are of Ashcolite D accurately machined to size.

The shaft is forged of high-carbon steel, machined to assure smooth running. The journal is electrolytically coated with pure chrome, to a depth


PUMP DISCHARGE
PRIMING CONNECTION
CLEAR WATER ENTERS MAIN VOLUTE AT THIS POINT
RADIAL BEARING WITH SPIRAL FLUTING FOR WATER LUBRICATION. SHAFT CHROMIUM PLATED AT BEARING
IMPELLER
THRUST BEARING
SUCTION END
OILER
RESILIENT PACKING BETWEEN SEALING RING AND SUCTION END
FILTER
BASE PLATE
FROM HOUSE SERVICE WATER MAIN PRESSURE NOT LESS THAN 20#
CLEAR WATER PIPING
TO PRESSURE SWITCH CONTROLLING PUMP MOTOR

Explanatory cross-sectional view of the centrifugal pump.

sufficient to allow for the maximum permissible wear. Permanent rigidity of the entire rotating element is assured by the exceptionally heavy shaft section, minimum overhand of impeller and the generous distance between bearings.

In the vertical-type pump, the thrust bearing is inclosed in a close-grained, gray-iron housing, which is provided with both set and lock screws, so that the location of the impeller may readily be adjusted and maintained. The bearing is grease-packed. In the horizontal-type pump, both thrust and radial bearings are rigidly supported by one heavy, gray-iron casting, thereby insuring accurate and permanent alignment.

Every Hydroseal unit is tested, before shipment, under conditions identical with those under which the unit will be operated, as to volume delivered and head developed. Curves showing the operating characteristics of various pumps will be furnished on request.

Offers New Heavy-Duty Model Gyratory Crusher

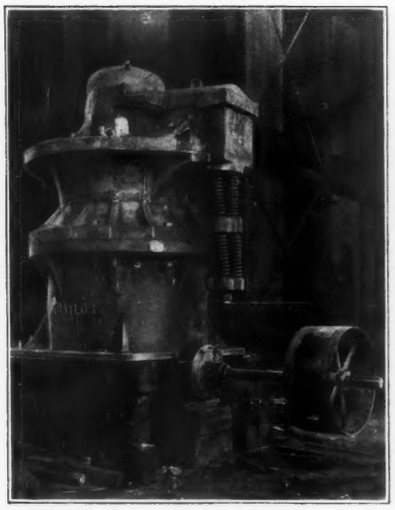
A new reduction crusher of great promise is being offered to the trade by the Traylor Engineering & Mfg. Co., of Allentown, Pa. The machine, which is styled the Type TZ, is designed with extra heavy proportions and built in six sizes capable of hourly production ranging from about fifteen tons, ½-in.-ring size, in the smallest machine, to nearly one thousand tons 2½-in.-ring in the largest size. This unusually wide range, the manufacturers feel, will meet any need.

The crusher is of the gyratory type with a bell-shaped crushing head, and the concaves are sharply convexed from top to bottom of the bowl. This design eliminates choking because the normal choking point of a standard type gyratory crusher (at the bottom of the head) has been moved upward to a point where the tendency to choke disappears. This elimination of choking results in a higher rate of output and finer and much more uniform product with a reduced percentage of undersize.

The Traylor Type TZ reduction crusher is designed with a balance lever and tension springs to support the head and shaft, the springs being adjusted to a tension sufficient to withstand the downward thrust of the head due to crushing, and yet to allow the head to be depressed to a liberal degree.

The TZ crusher will receive and crush larger rock than any other cone-type secondary-reduction machine, and the head may be accurately adjusted, during operation, for varying the size of product. The adjustment range, in any one machine, is fifty per cent—that is, if the original coarsest setting is 1½-in., the machine may be adjusted to break to ¾-in. or anything between these limits.

No feeder is required or should be used with the TZ, as it operates most efficiently and delivers maximum tonnage when surcharged or flooded. The wear of the head and concaves is much less per ton of output than in any other type of crusher and, therefore, the crushing surfaces hold the original shapes for a longer period of time than in other breakers, resulting in continuous uniformity of product and large capacity.



The 15-in. gyratory crusher.

In general, the Type TZ machine possesses all the tried and valuable features of the well and favorably known Traylor Bulldog gyratory crusher, including the bar-type non-weaving spider, the stocky, non-deflecting main shaft, the self-aligning eccentric bearing, the automatic-lubrication system with all elements contained within a sealed chamber, and the positive and entirely reliable dust-sealing device which excludes all dust and grit from the working parts.

Not the least feature and advantage of the new design is that, at reasonable cost, it may be applied to any existing gyratory crusher of any make and may be installed with or without the balance lever and tension springs. The effect of converting an old gyratory into a reduction crusher by installing the TZ type of head and concaves is to enormously increase the capacity at a smaller product size. The increase averages 50 to 75 per cent and there are some installations where the earlier capacity has been doubled with the product size less than that of the previous minimum setting.

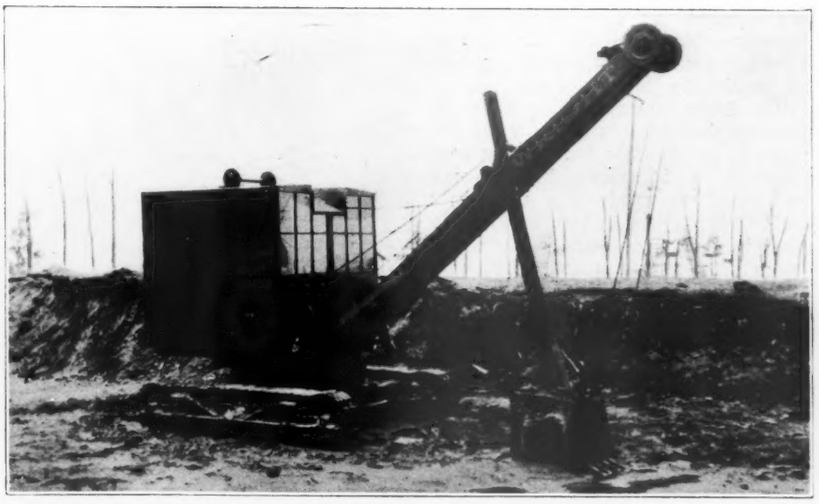
The manufacturers feel that this new crusher is a material contribution to progress in the rock-products industry, because the machine has greater capacities than has been the case heretofore with cone-type reduction machines, and the fact that adjustment is in a wider range and more easily accomplished. In addition, the adaptability of the design for converting old gyratory crushers, an exclusive feature, makes possible its use in many instances where conditions might not warrant the purchase of a new machine.

The Traylor Engineering & Mfg. Co. has many data of interest to users and many remarkable performance records, which it is anxious to present for the consideration of prospective purchasers. One of its representatives is immediately available on request from anyone interested.

Convertible Excavator of Simple Construction

The Wright excavator is a fully convertible, full-revolving, ½-cu. yd shovel, completely equipped with two drums and boom hoist, to handle any kind of shovel or crane work, but built with less than one-half the parts of any other machine for the like purpose.

Sturdy, heat-treated, alloy-steel castings are used throughout, to withstand shock loads of a machine of twice this capacity. Our simple, patented method of construction eliminating all unnecessary parts while still retaining as complete equipment as found on any other machine at any price, coupled with the use of roller bearings on all bearings of over 20



Convertible, full-revolving ½-cu. yd. excavator.

r.p.m., full force-feed lubrication to all other slow-speed, heavy-duty bearings and an excessive factor of safety built into every part, make this a machine that will give long service.

The hoist is made by removing the entire rear axle and differential of the McCormick-Deering Model 20 industrial tractor and substituting a chrome-nickel shaft mounted on four brackets with Hyatt roller bearings. This gives a hoist driven through an inclosed transmission with hardened gears running in a bath of oil which are designed to take the full power of the motor at any speed, giving a far greater percentage of the motor power delivered to the hoisting drum than can be secured through outside gears.

The drums are large and mounted on Hyatt roller bearings. The cross-shaft is of chrome-nickle steel, driven by two roller chains from each end of the drum shaft, thereby dividing all strains on this shaft.

The swinging gears are two 18-in., 45-deg. bevel gears mounted on the cross-shaft between the bearings. Each is actuated by self-energized cone clutches, one rotating the shovel in one direction, the other in the opposite. In this way, there is no backlash to take up when reversing the swing, which is absolutely noiseless. There are no overhanging shafts to break. The machine is manufactured by the Pontiac Tractor Co., Pontiac, Mich.

Develops Complete Line of Air-Separating Units

A complete line of air separators has been developed by the Bradley Pulverizer Co., Allentown, Pa. For many years this company has built machinery for cement mills and the experience thus acquired has been incorporated in the design and construction of these separators, with the assurance that cement manufacturers will receive complete satisfaction in their use.

There is no mystery connected with the use of air separators. A certain size machine working on a certain material has a definite output, requires a certain horsepower, and the results can be calculated definitely. The air separator lends itself most particularly to cement plants that are operating by the dry process.

Closed-circuit grinding is much favored by the cement manufacturer, because it reduces his horsepower consumption and allows his present machinery to produce a uniformly finely-ground product, which is so much in demand to-day. While every dry-process cement plant must consider the use of air separators, they have also proved their worth on the clinker end.

In addition it has other uses among the producers of rock, in connection with pulverizers for the production of agricultural limestone, rock dust for mines, or limestone for asphalt filler.

One installation of a 16-ft. Bradley separator is working in connection with a Bradley Hercules mill and permits the mill to produce three different finenesses of material, which are sold for different purposes.

One of the main features of the Bradley air separator is its simplified drive which is operating under the forced-feed lubricating system, the gears being immersed in oil to reduce the possibility of shutdowns. All bearings are liberal in size, well lubricated, protected from dust, and extremely accessible. Simple adjustments are provided so that changes in fineness can be effected in a minimum time. It is a staunch, well-built machine that will take its place in meeting the exacting requirements of producers of finely divided finished products.

Recent installations of note are those of the Nazareth Cement Co. and the Giant Portland Cement Co.

Shovel-Crane-Dragline to Be Ready by Spring

Harnischfeger Corp. of Milwaukee, Wis., announces a new 3/8-cu. yd. excavator now being put into production in its plant at Milwaukee to be ready for spring delivery.

This new machine, known as the Model 200-A, follows the same general design of the larger P&H machines. It is sturdily and compactly built with a large proportion of alloy steels and is light enough to meet the demand for a convertible excavator weighing under fourteen tons. Hoist, swing, crowd, and travel speeds are unusually fast.

Corduroys (crawlers) employ the P&H double sprocket drive on link pins instead of the links themselves. All machinery on the revolving frame is placed with a view to compactness but with full accessibility. Drums are mounted on separate shafts with the jack-shaft assembly between. The entire gear train is located on the right side of the machine and runs in an oil bath. Shafts operating in excess of 40 r.p.m. are roller-bushed. All clutches are of the internal-expanding type. Hoist and crowd clutches are interchangeable, as well as the five main, outside-type brake bands. Boom hoist is of the planetary type with automatic safety load brake.

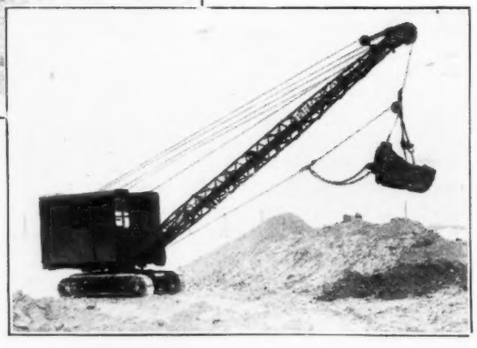
A four- or six-cylinder, 45-hp. gasoline engine furnishes ample power and provides unusual acceleration and speed.

The patented P&H chain crowd appears on the Model 200-A in a highly-perfected form. The dipper can be returned at more than twice the speed it is crowded out. Raising and lowering the boom does not disturb the adjustment of the crowd chains.

The P&H Model 200-A shovel is standard with a 17-ft. boom and 12-ft. dipper sticks, giving a total dumping height below door of 17 ft. The dragline and crane booms are of lattice box-section design with a standard length of 30 ft. The machine is fully convertible for shovel, dragline, clamshell-crane, trench-hoe, or skimmer-scoop operation.

An outstanding feature of the Model 200-A is its ease of operation. By means of power clutch control and very responsive brakes, the machine

Left—The new 3/8-cu. yd. shovel with loaded bucket raised to its maximum height.



Right—The new machine operating as a drag-line, using the 30-ft. lattice-box type of boom.

can be manipulated as easily as an automobile.

A substantial fully-enclosed steel cab is standard equipment. The entire machine is finished in a durable dark green enamel.

Mud-Jack Used to Lift Sunken Concrete Slabs

The maintenance of rigid types of pavements by correcting settlements of the subgrade is a problem of hard-surface road construction that demands the increasing attention of highway- and street-maintenance departments. With the changes in volume to which fills and grades are subjected, there is a tendency for settlement to continue over long periods.

The satisfactory compaction of grades and earth backfilled over trenches has been difficult. Iowa, for example, during the summer of 1930, raised approximately 19,000 sq. yd. of pavement in which there had been settlement due to subgrade changes.

A new method for correcting this settlement—one that is entirely different from any other—is accomplished by the N. E. C. Mud-Jack. The traffic is not stopped nor detoured. Dips from 1 in. to 18 in. deep can be raised with equal ease. The slab can be brought to the original grade in case of further settlement at a future time, and all this at a small cost.

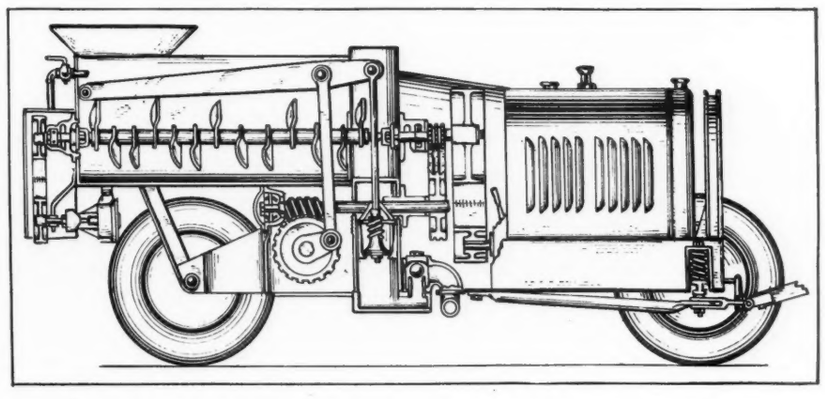
This method consists of mixing earth and water with just sufficient cement (usually about one bag of cement to a cubic yard of dry top soil), to take up the shrinkage. This mud is pumped through holes drilled in the slab, under pressure sufficient to force the mud under the slab and raise it.

The Mud-Jack is a special combination of mixer and pump. A truck, loaded with dirt, over the top of which has been spread the proper amount of cement, is backed up to the mixer. The material is shoveled from the truck into the hopper and mixed with the water. Water is usually hauled to the site in a water-tank and is pumped from this tank to the mixer by a rotary pump that is a part of the machine. With the addition of the water, the material is worked into a fine mud which flows into the top of the pump cylinders. The pump forces the mud through a hose placed in the hole drilled through the slab. Normally, about three holes are drilled for each 8 ft. of 18-ft. road-slab.

The advantage of this method is obvious. There is a minimum delay to traffic, the grade is tightened up, and the slab brought back to its original position. Any future settlement can be corrected economically.

A pressure of 1 lb. per sq. in. exerted by the Mud-Jack is more than sufficient to raise the pavement. Actual operation of the Mud-Jack bears out this statement, although higher pressures are sometimes necessary to first pry the pavement loose from the subgrade.

The diagram herewith shows the operating parts and illustrates the flow of power through the machine. The machine is offered by the National Equipment Corp., Milwaukee, Wis.



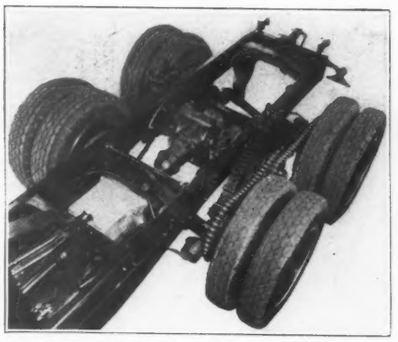
Cross-section of the mud jack showing mechanical details and power take-off.

Presents New Trucks of 3/4 to 12 Tons Capacity

The Sterling Motor Truck Co., Milwaukee, Wis., announces an entirely new line of motor trucks, contending that it is the most complete line offered by any one builder in the world. The line includes 29 distinct models of various capacities from ¾ to 12 tons, in a broad array of wheelbase lengths in bevel, worm, double reduction, chain and dual drives for commercial and dump hauling.

The new line of bevel-drive trucks include six models from ¾-ton to 4-tons capacity. Model FB-30 is powered with a six-cylinder, 60-hp. engine and has a carrying capacity of ¾ to 1¼ tons. All are popularly priced and wheelbase lengths vary from 142-in. to 204-in. They are built for speed and equipped with hydraulic four-wheel brakes, the larger models having boosters to increase their braking efficiency.

Five double-reduction-drive speed trucks of medium to heavy carrying capacities are offered with wheelbases from 126-in. to 222-in. The model FD-80 is rated at 3½ to 4 tons and is powered with a Ricardo Red Head engine. Model FD-140 is a heavy-duty unit of 7- to 8-tons capacity, while model FD-170 is a still bigger unit of 9½- to 10½-tons capacity.



View of rear end of truck chassis showing the dual-chain drive.

Four models are offered with worm drives. The axles are by Timken, the disk steel wheels by Budd. All engines have the Ricardo Red Head combustion chambers. Wheelbase lengths vary from 126-in. to 230-in., suitable for tractor, dump and commercial hauling. Hydraulic or air brakes are obtainable.

Many improvements have been incorporated in the chain-drive series which comprises seven models from 5 to 10 tons. All models have four-speed transmissions. At a moderate additional cost, a Sterling patented auxiliary transmission is installed, giving twelve forward speeds. The super-section frames are made of manganese steel, heat-treated for maximum strength.

An entirely new principle in 4-wheel chain-drive units is introduced. Both sets of rear wheels are driven with but one jackshaft, with the springs, wheels, radius rods and chains moving about a single common center. It provides differentiation, with perfect division of power for all wheels.

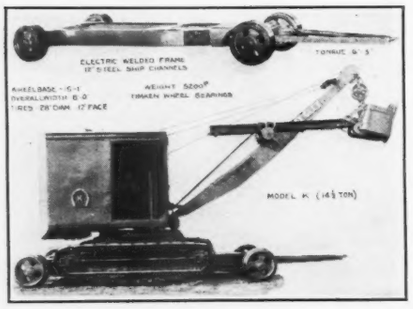
This unit is supplied in three sizes ranging from 7 tons to 12 tons. Wheelbase lengths are optional. Westinghouse air brakes are standard equipment.

Sterling also offers a complete range of dual-worm drives, all equipped with Westinghouse air brakes. Wheelbase lengths are optional.

Advanced exhibits of the new models are now being held by Sterling branches and distributors in various cities.

New Trailer Transports Big Shovels or Cranes

A new four-wheel trailer has been developed by Bay City Shovels, Inc. primarily for the purpose of carrying Bay City ⅜-cu. yd. tractor shovels (10-ton), as well as the Bay City Model K revolving shovel (14½-ton). This trailer is constructed with a sturdy electric-welded frame made up of 12-in. steel ship channels. The wheel base is 15 ft. 1 in. long and has an



Trailer for transporting shovels.

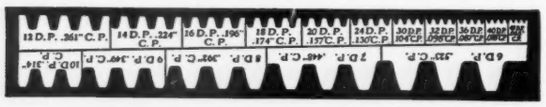
over-all width of 8 ft., making it possible to use the trailer on all state highways without a special permit. Tires are 28 in. diameter, with 12-in. faces. Heavy-duty wheels are equipped with Timken bearings.

Bay City shovels can be loaded on this trailer in eight minutes. The new trailer is not simply an extra-wheel arrangement for bolting under a machine, but a complete trailer which can be used not only for Bay City equipment, but for handling any other shovels, cranes or excavating equipment up to 14 tons in weight.

While developed primarily to provide Bay City machine owners with a low-priced trailer for their equipment, its sale will not be limited to Bay City owners.

Free Pitch Gauge Gives Accurate Gear Outlines

For the benefit of engineers, master-mechanics, stock-room clerks and others desiring a quick method of identifying the pitch of gear teeth, or of obtaining their outline without the need of the regular method of "laying out" on the drafting board, the Ohio



Gauge for determining gear-teeth pitch.

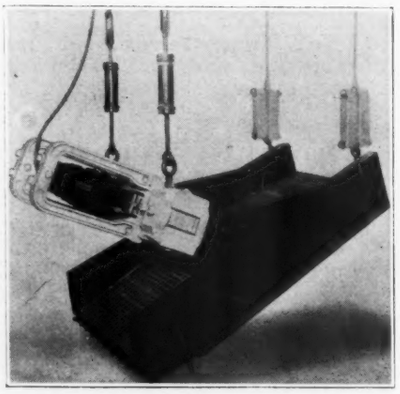
Gear Co., East 179th St., Cleveland, O., has prepared a handy pocket gauge, having correct outlines of all gear teeth from 6 to 48 diametral pitch stamped around the edges.

These gauges will be distributed free to Ohio Gear Co. customers shortly. Others desiring to obtain one of these gauges will be gladly supplied without charge, on request, by writing to the company.

Alternating Current Is Used to Vibrate Screen

The Traylor Vibrator Co., of Denver, Colo., announced, sometime ago, the development of the Trayco Conveyanscreen. The screen brings a number of new and interesting practices to the art of screening. The power unit, designated as the vibrator unit, is mounted above the screen sash and imparts its vibration at an angle to the screening plane. This rapid oscillation produces a sharp screening action as well as a conveying motion. Thus, the screen can be operated practically flat and, therefore, does away with the necessity of setting the screen at an angle where gravity will cause the flow of the material across its surface.

The manufacturer states the Conveyanscreen produces more accurate sizing because the angle of vibration causes the material to keep in closer contact with the screen cloth. The power units which vibrate the sash are the same type and design as those used on Traylor vibrating conveyors which have been in use in conveying practice a number of years. The vibrator is suspended so that all the vibration is absorbed within the unit and



New type vibrating screen.

none is transmitted to building supports.

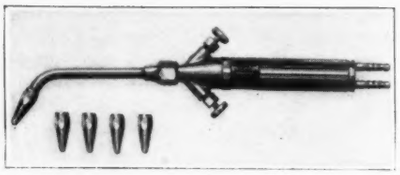
The power unit takes its energy from any standard alternating current and through the use of a small motor-generator set, furnished with the screen, the intensity of the vibration is under rheostat control and can be varied to meet individual requirements.

The screen is furnished in four standard widths and in any length necessary to accomplish the duty.

The manufacturer's bulletin giving further details of the Conveyanscreen is designated as No. S-102.

Welding Blow-Pipe for Work on Sheet-Metals

The type W-107 welding blowpipe has been added to the Prest-O-Weld line by The Linde Air Products Co. as an improved sheet-metal blowpipe to be handled through Prest-O-Weld distributors. It is suitable for light welding work of all kinds. In design and appearance it is somewhat similar to the Oxweld Type W-15 blowpipe, described in the Sept. 24, 1930 issue of PIT AND QUARRY, except that it operates on the medium pressure principle. The gases mix immediately in front of the handle and the oxygen and acetylene valves are so located that they can be readily adjusted with the thumb



Welding blowpipe for light duty.

and forefinger of the hand which holds the blowpipe. The blowpipe is 10½ in. in length, weighs only 10 oz. and is perfectly balanced. Six different size tips are available for use, although it is furnished as standard with 5 tips, No. 2 to No. 6 inclusive. The blowpipe possesses many advantages in operation as it is small and light so that it can be readily handled where fine and accurate work is required.

The complete Prest-O-Weld W-107 welding outfit includes not only the blowpipe but a Prest-O-Weld Type R-106 oxygen regulator, Prest-O-Weld Type R-107 acetylene regulator, two 25-ft. length of 3/16-in. hose, 1 pair of fibre spectacles, 4 hose clamps and instruction book. Further information regarding the blowpipe or the complete outfit may be obtained from any of the district offices of The Linde Air Products Co.

Tractor Dump Wagon Is Flexible in Operation

The Camel is the trade name given by the Shunk Mfg. Co., Bucyrus, O., to its automatic tractor dump wagon. The manufacturer claims that the Camel will go where trucks can not travel; that it is handled easily in limited space, forward or backward; that it increases the capacities of power shovels; and that it requires little attention.

It combines, in a single heavy-duty unit, the best profit-earning features of a truck, tractor, trailer and bulldozer.

All models of the Camel are adaptable to an interchangeability of wheel

The versatile tractor dump wagon.

equipment. Crawlers, steel wheels or pneumatic tires may be mounted in the field with surprising ease and speed.

The unique scow design of the body affords clean dumping of the load with a minimum effort. The wearing points are given added strength through double thickness. The sides are reinforced with heavy oak planking.

Legal Information for Operators

Owner Not Obliged to Pay for Building Stone

Under ordinary circumstances a person is obligated to pay for all material utilized to improve his property. However, if the contractor purchases the material without knowledge of the owner, this usual rule is modified.

For instance, in a late case (156 S. E. 87), a seller, without notice to an owner, furnished stone to a contractor who used it in construction work. The owner accepted the structure and when the contractor refused to pay for the stone the seller sued the owner on the contention that the law implies that a property owner will pay a reasonable amount for materials used to improve his property. However, the Court refused to hold the owner required, under these circumstances, to pay for the stone.

Husband and Wife Held Jointly Liable for Lien

It is important to know that a material man is not entitled to a mechanic's lien on property in name of a husband and his wife, unless both parties sign the contract for work and materials.

For instance, in Cochran v. Johnston, 25 S. W. (2d) 130, only the husband gave permission to construct a building on a lot owned jointly by the husband and wife. The Court held the lien invalid, saying:

"There is no evidence to show that such authorization to construct the building was with the consent or knowledge of the wife, and she is therefore not bound by it. . . . The materials used in the erection of the building may be charged upon the building, but not upon the freehold."

Permits Gravel Firm to Choose Shipping Method

Frequently, when deciding litigations involving contracts, the Courts render decisions based upon common sense, instead of the actual wording of a contract. This rule of the law usually applies when its application harms neither of the contracting parties.

For instance, in Hewlett v. Goodwin-Gallagher Sand & Gravel Corp., 171 N. E. 758, it was disclosed that a gravel company entered into a lease contract with a property owner providing that the gravel company would remove not less than 225,000 cu. yd. of sand, gravel, and grit per year during the term of the agreement, or pay for such quantity at minimum rental. The lease further provided that a statement of the quantity of sand and gravel shall be rendered at the end of each month to the owner "and all sand and gravel shall be measured in the vessels on which it is loaded and at the dock where the same is loaded."

Later litigation developed when the gravel company decided that instead of loading the material on vessels it would make shipments by railroad. The property owner contended that the gravel company was obligated by the lease to make payments according to measurements in vessels.

It is interesting to observe that the Court refused to render its decision in favor of the property owner, saying:

"There can be no doubt that the parties expected that the material would be removed from the premises by vessels, and in view of that expectation they provided for measurement at the dock or on the vessels. . . . Measurement on vessels is merely part of the machinery for fixing the amount due under the lease. It is not an essential part of the lease and does not justify reading into the contract, by implication, a covenant to build docks and load vessels on the premises merely to facilitate the measurement of the material removed."

Right of Mortgagor to Collect Property Rental

It is important to know that a recent higher Court held that a mortgagor may pledge the rents and profits of real estate in a mortgage to secure the payment of the mortgage debt. However, such provision does not become practically effective until a receiver is appointed or the mortgagee goes into actual possession, for as long as the mortgagor continues in possession he can collect the rents. In other words, although the mortgagor pledges the rents, he is privileged to collect the same so long as he has possession of the property.

For illustration, in Carolina Portland Cement Co. v. Baumgartner, 128 So. 241, it was disclosed that the owner of property delivered to the Hearn Construction Co. a note for $25,250. To secure its payment he also contemporaneously executed and delivered his mortgage incumbering his property. The construction company assigned the mortgage to a cement company. The mortgage contained a clause that the mortgagee shall have the right to the rents and other income from the property. Litigation developed when the owner refused to pay the rents to the cement company. In holding the owner entitled to collect the rents until a receiver is appointed, the Court said:

"It is generally held that, in the absence of a statute or agreement to the contrary, a lessee may mortgage or incumber the leasehold estate. . . . And the owner of property can as a general rule assign the rents and profits or appropriate them to any desired purpose. . . . Clauses of this character are so frequently embraced in mortgages these days, that the question becomes an important one. . . . The mortgagor, even after default, can collect the rents, and dissipate them, and the mortgagees are powerless to prevent it, although the mortgage expressly pledges the rents as part of the security, unless a receiver be appointed to impound the rents pending the foreclosure proceedings and hold them subject to the orders of the Court."

Liability for Defective Materials in Structure

The law is well established that a contractor is not entitled to payment and that he is liable to an owner if the building does not conform with the plans and specifications. The same rule is applicable to sellers of non-metallic mineral products which do not equal the quality specified in the plans and specifications. The amount of damages usually allowable by the Courts is the reasonable cost of altering the building to conform with the contract. So held a higher Court in the late case of Morel v. Simonian, 284 Pac. 694. Here the specifications provided that the cement should be three inches thick. When the job was completed it was discovered that the cement, instead of complying with the specifications, was only two inches thick. The higher Court promptly held the contractee entitled to recover damages.

Motor-Truck Driver Is Held Liable for Crash

Usually the driver of a motor-truck who negligently collides with any large object standing still on a street is not entitled to recover damages for the injury. Morover, he may be liable for damages resulting to others.

For illustration, in Bryne v. Atlantic, 168 N. E. 540, it was shown that a large motor-truck collided with an excavator left in the street thereby seriously injuring the driver of the truck who sued for damages. The Court held the injured driver not entitled to damages, saying:

"Collision of a motor-truck in the circumstances here disclosed with an object of the size and nature of an excavator stationary on the highway is some evidence of negligence on the part of the driver of the truck. . . . In the ordinary experience of mankind a moving vehicle does not without negligence of those responsible for it come into collision with a stationary object of the size of an excavator."

Helping the New Employee to Become a Safe, Efficient Workman

By W. DEAN KEEFER
Director, Industrial Safety Division, National Safety Council

ONE of the most important steps in a plant safety program is teaching safety to the new worker. Therefore we are suggesting this topic —"The New Worker"—as the leading subject for your April plant safety meeting.

It is evident, of course, that accidents are more apt to happen to the new worker than to the trained worker. In an analysis of over 2,600 accidents by the U. S. Bureau of Labor Statistics, new workers who had been employed less than six months had more than two and one-half times as many accidents as those who had been employed between three and five years; and they had more than twelve times as many accidents as those who had been employed ten to fifteen years.

It is suggested that the chairman of this meeting should arrange with one or more members of the safety committee to discuss such questions as:

1. The new worker's lack of knowledge of the job.
2. How the employment department can help.
3. How the foreman can help.

As a part of the program, advance arrangement should be made with the manager of the employment department to discuss the methods followed by the plant employment office in selecting men.

The experience of members of the National Safety Council shows that it is advisable to reach the new man just as soon after his employment as possible. If the new worker gets a wrong start and forms unsafe working habits, he later must unlearn all of these wrong habits. When the worker is being taught safe working habits he is also being taught efficiency. With proper training, it is just as easy for him to form good working habits as bad ones.

The employment manager is naturally interested in safety because a large percentage of accidents usually occur to new employees, and the prevention of accidents will reduce his labor turnover. The new worker at the time of his employment appreciates receiving information about the plant; this instruction also results in saving the time of the foreman and other production supervisors. Many companies at the time of employment distribute safety rule books and these books often are given out by the employment department.

As another feature of the program, a foreman whose department has a good record could be called on to discuss just how his department "breaks in" a new man. To supplement this talk, it may be possible to have a new man, recently "broken in" by this foreman, give his own impressions concerning the methods used and his own suggestions for possible improvements.

Following these leading talks there should be a general discussion. Every person in attendance should be afforded the opportunity to talk freely and to make suggestions for the improvement of plant safety methods. These suggestions should be carefully recorded by the secretary of the meeting. The chairman should guide the

meeting toward the discussion of such topics as:

1. What instruction should the new man receive from the employment department?
2. What instructions should he receive from the medical department?
3. How much attention should be given to the proper placement of a man with particular reference to his physical fitness.
4. Is the new man being properly instructed regarding the safety rules of the plant as they apply to his own job.
5. Is there any way in which employee publications of the plant may be of greater assistance.

The chairman may gain valuable information for the meeting through an advance study of the safe-practices pamphlet of the National Safety Council on "Teaching Safety to New Employees." This pamphlet is available on request.

It is suggested in this pamphlet that the new worker should receive, from some source, initial safety instruction on the following subjects:

1. The fundamental principles of safety.
2. The proper use of safeguards provided by the company.
3. The necessity of reporting for first aid for every cut or scratch, no matter how slight.
4. Instruction regarding typical accidents which have occurred in the plant, to illustrate the hazards of the work and the hazards of the department to which the new employee has been assigned.
5. Various types of accidents, and safe working conditions, to be illustrated by the use of slides, motion pictures, photographs and posters.
6. Impress the new worker with his individual responsibility in protecting himself and safeguarding his fellow workers, so that he will develop the habit of "thinking safety."

An appropriate way to conclude the meeting would be for the chairman to summarize the various suggestions which have been made for the safety training of the new employee, through making use of the notes which have been taken by the secretary of the meeting.

During this meeting the attempt should be made to keep the point of view of the new worker. It should be remembered that accidents are caused to new workers in part through his lack of familiarity with the plant, the hazards, and plant working conditions. Also the new worker is nervous, through a natural desire to equal the production and the speed of the more experienced workers.

The foreman is sometimes at fault through taking for granted that the new man knows more about his job than is actually the case. A new man naturally will try to play up to this high opinion of him, and he may attempt more than he should and submit himself to hazards which normally he would not do. Many serious accidents thus have resulted—accidents that are costly to the management, to the man, to his family, and to his fellow workers.

Shovel Maker's Eastern Offices Now in Newark

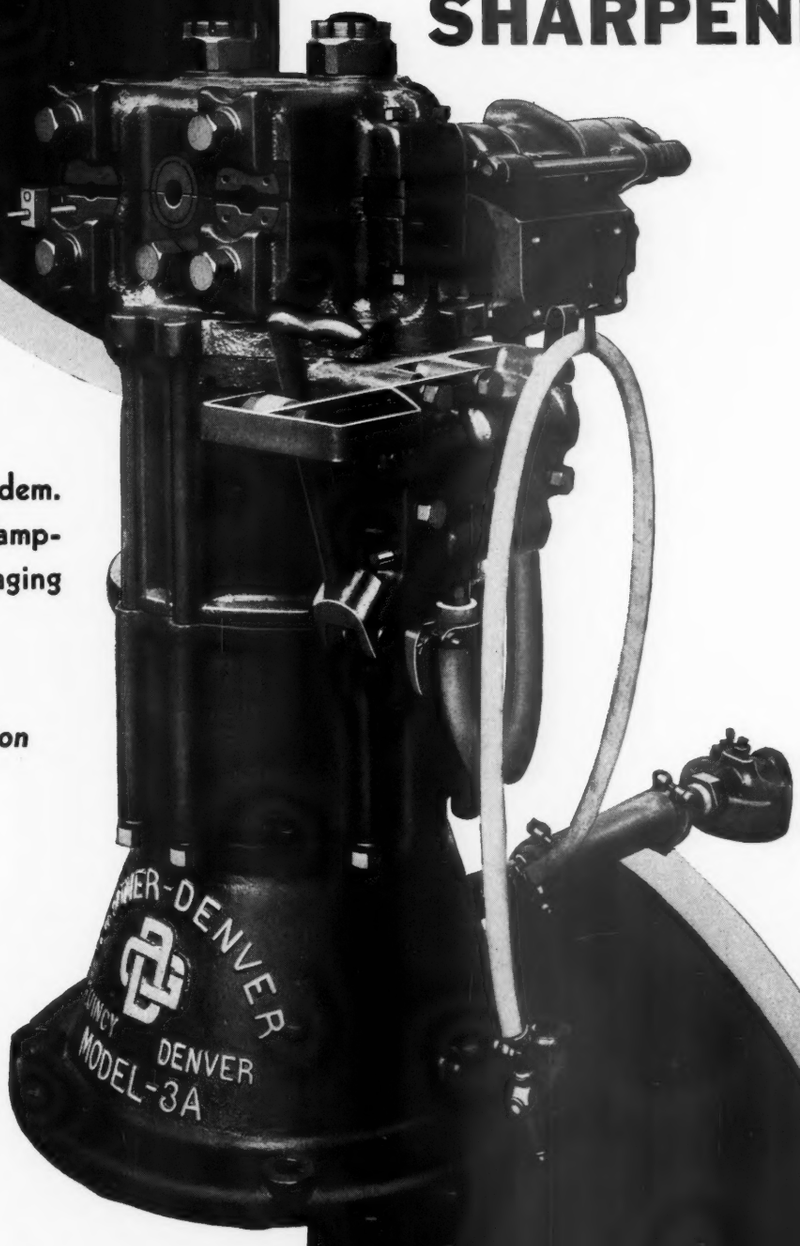
In order properly to care for the increased business in the New York territory, which required larger quarters, The Ohio Power Shovel Co., Lima, O., with branch offices formerly located at 2351 Graybar Bldg., New York, N. Y., has now moved into its new combined sales office and warehouse located at 317-319 Frelinghuysen Ave., Newark, N. J.

Locomotive Firm Names Eastern Sales Agents

The Mid-West Locomotive Works, Hamilton, O., has appointed the Brown & Sites Co., Inc., 30 Church St., New York, N. Y., to handle its sales in northern New Jersey and southern New York. Mid-West locomotives will be handled in eastern Washington, western Montana and throughout Idaho by the General Machinery Co., Spokane, Wash.

EXTREMELY LOW
AIR CONSUMPTION

DS-3A
DRILL SHARPENER



Two die pistons in tandem. Both pistons used for clamping. One piston for swaging and gauging.

Result—
Low Air Consumption
Long Life

GARDNER-DENVER COMPANY
QUINCY, ILLINOIS
Branches In All Principal Cities

DS-3

SINGLE THROTTLE CONTROL

GARDNER-DENVER